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AN NOSTRAND SEARCHLIGHT BOOK #18

Transportation and Politics

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Geographer, Planning Division,
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Transportation and Politics

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Preface

From the armies of Cyrus the Persian, diverting the waters of the Euphrates so that they might steal into Babylon along its dry bed, to the Russian and American scientists racing for the moon, the story of man can be told in terms of transportation and politics. The armies symbolize man's uninterrupted history of aggression; so, to a certain extent, do the scientists, but they symbolize even more man's desire for freedom, not merely from the oppression of his fellow men, but from his earth-bound condition itself. Perhaps the most picturesque (and poignant) way in which both these aspects of the relation between transportation and politics has been expressed is in the phrase describing the exodus of the refugees from Eastern Europe, who "voted with their feet."

We are all politically involved with transportation in so great a variety of ways that a mere catalogue of these ways would surprise us. But, however much transportation pervades almost all political discussions, it is very rarely placed at the center of interest. Instead, politics is the main subject, and transportation is incidental to it.

When transportation is the main subject, it is usually thought of as an economic activity. This custom was disputed as long ago as 1894, in a lengthy paper prepared by Charles H. Cooley under the title "The Theory of Transportation." The paper, running about 40,000 words (the same length as the book you are now reading), remains unique. In the nearly seventy years that have passed since its appearance, nothing has been published anywhere that comes even close to superseding it. For many years to come it will be, as it is today, the touchstone by which the value of any new attempt to understand the part that transportation plays in human affairs must be judged.

By this touchstone, much of the best theoretical work now being done on transportation must be found wanting. "There can be no adequate theory of transportation," says Cooley, "which has regard only to some one aspect of its social function, as the economic aspect.

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That is not the only aspect, nor can one truly say that it is more important than the others. All are co-ordinate, equally indispensable to social progress." Later he adds:

p. 44.

> In order, therefore, to develop a theory of transportation that shall be at all adequate, one must examine severally its relations to various social institutions. For this purpose I shall for convenience classify those institutions as military, political, economic and ideal, including among the last all forms of organization having primarily religious, ethical, intellectual or artistic purposes. It is a sufficient defense of this classification that it corresponds well with the concrete facts of history. These classes of institutions are those which are in fact most obvious in the study of the past. As soon as institutions begin to differentiate at all they differ in this way. . . .

These statements, as true for the study of the geography of transportation as for the study of its history, are incontrovertible, and yet they have gone unheeded. If one wishes to learn the interrelations between transportation and political, military, or what Cooley calls "ideal" institutions, one must turn to writings that are directed toward a study of these institutions, in which the relations with transportation are at best peripheral. Where transportation itself is at the center of interest, it is inevitably the *economics* of transportation that is discussed, with the implication that once this is understood, transportation is understood.

In the present study, transportation is at the center of interest, but its economic relations enter only when they have political significance. It is the political implications of transportation that primarily concern us.

My creditors are legion—the many authors, some named, but most (to my regret) unnamed, from whom I have borrowed facts and ideas; the students in the Department of Geography at the University of Washington, and colleagues both there and in the Ontario Department of Highways, who have helped me with their criticism; the editors of the Searchlight series; and many, many others. My greatest debts I owe to my friend Professor W. A. Douglas Jackson, but for whom this book would never have been begun, and to my wife Rosemary, without whose devoted help it could not have been finished.

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1 *Introduction*

POLITICS AS SPATIAL INTERACTION

WHEN everything has been said about political events and political institutions, there is one fact, sometimes stated but frequently not even implied, that underlies all of them: they always involve men interacting over distance. Ultimately, political organization is spatial organization. Though it is men who organize and are organized, the terminology used is that of space—the parish, the electoral district, the nation within specified physical boundaries, the empire on which the sun never sets. In these terms, in terms of sheer position and extent, politics is static and essentially meaningless. It takes on meaning only when we recognize its most important element—its dynamics. Then it is seen that the nation can maintain its existence within its specified physical boundaries only because somewhere within it there is a core, a focus upon which power is centered and from which control over all parts of the nation, even the most outlying, radiates. The dynamics of politics requires that there be effective *communication* between men occupying various areas of a political entity, and between men controlling different political entities. It further requires that there be the possibility of physical movement, that is, of *transportation,* among these areas and between these entities—transportation of goods, of men, and, in times of stress, of the means for making war.

To attempt to set up rigid boundaries between communication and transportation is as fruitless as would be an attempt to separate physics from chemistry. They shade into each other; indeed, the French term *circulation* comprises the two. Yet they are obviously not identical. In the present discussion, the emphasis is on the rela-

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tion between transportation and politics, and communication enters only when it cannot be logically excluded.

That transportation is fundamental to politics is universally recognized, though rarely as explicitly as it was by the Canadian politician of the nineteenth century who proclaimed that railways were his politics, or in as extreme a form as that of Philip Guedalla, who once wrote: "The true history of the United States is the history of transportation . . . in which the names of railroad presidents are more significant than those of Presidents of the United States." But when political errors and incompatibilities have brought affairs to a climax, and the nations resort to war, the overriding importance of transportation is finally brought into the open. For then the instruments the nations use to bring each other to submission, the military services, are classified in terms of the criterion of transportation, and no other: the army, the navy, and, in the present century, the air force.

Whatever justification there may be for setting up rigid distinctions between political and military studies in other contexts, there can be none when attention is focused on the role of transportation. It is not necessary to fall back upon Clausewitz's famous and variously-translated aphorism, that "war is the continuation of policy [or politics, or diplomacy] by other means." One need only note the connotations of the word "history." If one wishes to deal with the history of music, or social customs, or biology, or painting, or literary criticism, one must say so explicitly. "History" taken by itself *always* means political history, and here war takes the most prominent part. Indeed, that is precisely the meaning of the saying, "Happy is the nation that has no history." And what is the title of the first great work of history? Why, it is *The Peloponnesian War,* by Thucydides.

In thus confounding war with politics, we run directly counter to the procedure advocated by the pioneer student of the theory of transportation, Charles H. Cooley, whom we quoted so approvingly in the Preface. In his own work, Cooley thought it best to separate the discussions of military and political transportation, because, al-

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though military and political organization were nearly identical in early states of development, "the military aspect continually lessens in importance, the political increases as time goes on . . ."[1] But Cooley published in 1894, in a time that now looks idyllic. The history of the intervening years would scarcely encourage us to agree that the military aspect is decreasing in importance. Never has it been of greater importance than this very day.

In a study of transportation and politics our primary concern is less with history than with geography, and it would be dangerous to push analogies between the sister disciplines. "Geography" taken by itself does not mean "political geography"; indeed, the latter is but a very small specialty of the former, only now coming into its own. For this reason it is possible to distinguish between "political geography" and "military geography" in a thoroughly meaningful way. But when the emphasis is on transportation, they mingle so completely that it would be as undesirable to attempt to separate them as it would be to write about "history" without paying attention to its wars.

The subject of transportation is itself extremely complex; so is that of politics. To attempt to examine the relations between the two is therefore to perform a wedding of complexities—a most hazardous undertaking. Perhaps the greatest single hazard is that of offering deterministic, single-factor explanations for highly involved processes, the danger of succumbing to deterministic rhetoric. Harold and Margaret Sprout, in presenting their cogent arguments against such rhetoric, offer five examples of its use, of which all but one involve transportation and politics in some way. Thus, for instance, "England *driven* to the sea . . . seemed *destined by geography* to command the seas," and "Sea routes have *beckoned* the Japanese abroad" (italics provided by the Sprouts).[2]

Even without the rhetoric there remains the hazard, which is in-

[1] Charles H. Cooley, "The Theory of Transportation," *Publications,* American Economic Association, Vol. 9 (May, 1894), p. 53.

[2] Harold and Margaret Sprout, "Environmental factors in the study of international politics," *Conflict Resolution,* Vol. 4, Dec. 1957, p. 309.

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herent in the attempt to simplify and generalize, of seeming to offer deterministic, single-factor explanations when one does not intend to do so. In concentrating on just those aspects of transportation and of politics that have mutual relevance, we must leave a great deal out. Either we assign causes and effects, or we do not. If we do not, we may just as well not bother to say anything, for what is there to say? If we do, the treatment must be so highly selective that we can assign only *a* cause, the single relevant one, out of the many causes we may be aware of, for a given effect. It is very hard for the reader not to take this as *the* cause, and lo, we have our deterministic, single-factor explanation. What is required, then, and what I now solicit, is a certain amount of co-operation from the reader.

THE POLITICS OF MOTIVE POWER

Much of the relation between transportation and politics is bound up with the politics of motive power, and it will be well, in this introductory statement, to include a brief summary of this subject.

Motion has been both easier and more difficult on water than on land. A favorable current of water or air can supply all the power needed to move a ship of any size, but for thousands of years only the muscles of men, straining on oars, could move ships if the currents were absent, or worse, contrary. With unimportant exceptions, movement on land has always required the purposive application of motive power, and in the beginning the muscles of men once more supplied that power. In time man learned to make use of muscles other than his own, but some civilizations, notably those of pre-Columbian America, never learned to do so. Instead they brought the system of land transportation founded upon this one source of energy to a remarkable state of perfection. In Europe and Asia animals were early brought to the aid of man. Invention of the wheel, and later of horseshoes, stirrups, bits, harnesses, and lighter vehicles, greatly extended the range, both of load and of distance, for the transportation of people and goods.

For thousands of years the history of man revolved about his use of animals to pull and carry loads, particularly on military expedi-

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tions. Empires were consolidated by the use of familiar beasts in familiar ways. Empires foundered when strange beasts, or beasts strangely accoutered, or used in unfamiliar ways, were thrown against them. Sometimes animals affected the course of events in entirely unexpected ways, as can be seen from the following passage, which deals with the first World War:

> French, Germans, Russians and Austrians had unexampled masses of cavalry ready at the outbreak of war. But in the opening phase they caused more trouble to their own sides than to the enemy. From 1915 on, their effect was trivial, except as a strain on their own countries' supplies: despite the relatively small number of British cavalry, forage was the largest item of supplies sent overseas, exceeding even ammunition, and thus the most dangerous factor in aggravating the submarine menace; while by authoritative verdict, the transport trouble caused in feeding the immense number of cavalry horses was an important factor in producing the Russian collapse.[3]

From use of the energy of living organisms, technology progressed to the use of energy stored in the metamorphosed remains of dead organisms, in the form of coal, oil, and gas. Once these sources of energy became paramount, economic and later political dominance passed to those nations that had both a good supply of them and the ability to exploit them. Later still, much political activity was generated by the efforts of advanced nations to gain control of the oil deposits in nations less advanced. Since transportation accounts for a third of the oil used in Europe and Canada, and half that used in the United States, it may be said that control of the sources of energy for motive power has underlain a large part of the political activity in areas that have a very large surplus of oil, such as the Middle East.

THE EASTERN MEDITERRANEAN

The lands surrounding the eastern Mediterranean (see Figure 1) appear prominently in the chronicles that follow. They show in mi-

[3] Liddell Hart, quoted by Carroll Quigley, *The Evolution of Civilizations*, Macmillan, New York, 1961, pp. 52-53.

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crocosm the problems of transportation and politics that appear everywhere. They form a sizable area, about half as big as the United States, or something less than one per cent of the total area of the earth's surface—big enough to have room for an extremely broad range of physiographic conditions and to provide the theater for historical events embracing the whole of recorded time without a break, from the earliest dawn of civilization to this morning's crisis.

Here is the true "Afeurasia," the meeting place of the three continents. Historically, the term "meeting place" is inexact, for man did not start elsewhere and learn that the continents came together here; he started here, and gradually, with immense difficulty, learned that his little world spread out into vast continents. In the middle of this little world ("mediterranean") was the sea. The names Africa, Europe, and Asia were originally given to its shores, and in time extended to the land masses that were found to stretch beyond them.

The eastern Mediterranean has always played a disproportionately important part in world politics, from the time of the early river civilizations neighboring it (Mesopotamia, Nile, and Indus), through the time when the paths by land and sea between Rome and China passed through it, and on to the present day. It has always been the crossroads of history, and it is precisely to its position athwart universal transportation routes that it owes the perpetual political tension under which it has always existed. Only recently has the other aspect of transportation, that of the source of motive power, entered the picture. In the past, it was the route itself that was important. Merchantmen laden with wheat for Greece passed from the Black Sea through the Dardanelles, and later merchantmen brought wheat from Egypt to Rome. Caravans brought silk from China, and other caravans, as well as ships, brought spices from India that they had picked up at ports of the Persian Gulf and the Red Sea. The economic desires that these movements fulfilled, reinforced by power drives felt by men and nations, led to constant political activity in the area. Alliances and confederations formed and re-

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formed, navies battled on the seas, armies passed up and down the Nile and through the Cilician Gates (through the Taurus Mountains in present Anatolia) and over the Syrian Saddle (where the Euphrates most closely approaches the Mediterranean coast).

Acquiring control of transportation routes, and safeguarding them once they were controlled, generated a great deal of political activity, military and otherwise. But transportation itself, the actual ability to move through the application of motive power, was always the means of, but never the end for, political action. The taking of slaves was a major occupation in the ancient Mediterranean world, but slaves were not as ubiquitous a source of muscle power for galleys as we may think. Considerable skill was required of the oarsman, particularly on men of war, where quick maneuverability was essential, and free men were much more likely to acquire this skill than slaves.

Even the construction of the Suez Canal may be said to have left the pattern unchanged. It has revolutionized the relations between transportation routes, and in so doing has had some effect on the amount of motive power that must be expended in travel from one point to another. But active power itself has not been directly instrumental in causing political upheaval.

Nor did the coming of the age of coal greatly affect this aspect of political relations, because the eastern Mediterranean is deficient in coal deposits. But its gargantuan oil resources have brought a radical change. It is oil itself, as a source of power, and particularly of motive power, that has stimulated much of the political activity in the eastern Mediterranean during the present era. The transportation routes that most need safeguarding today are oil pipelines.

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2 *Barriers and Corridors*

PRECISE definitions of the terms "barrier" and "corridor" as they are used in the present context would be desirable, but it is not possible to provide them: barriers do not always serve as barriers, nor corridors as corridors. Even when they perform as expected, the reasons for their doing so are exceedingly diverse. They may have physical, psychological, historical, or social causes; a slight change in any one of these factors may have radical results, so radical, indeed, as even to turn an impenetrable barrier into a wide-open corridor.

Nor is it at all easy to predict the type of political activity that will be generated by barriers and corridors, even when these are performing what may be thought of as their proper roles. This point is well illustrated in the following comparison of the political activities revolving about a quintessential barrier and a quintessential corridor.

THE PAMIR KNOT AND "THE COCKPIT OF EUROPE"

Our quintessential barrier is the Pamir Knot, from which the great mountain chains of Asia radiate. (See Figure 2.) The Pamirs long ago became a focus of history, as they still are. They have done so because, paradoxically, they have always stood at the extreme limits of things. This small area is as far eastward as the Persian Empire ever extended, and as far as Alexander the Great ever penetrated. From the opposite direction, it is as far as the Chinese Empire ever reached in its westward expansion. Today it is the meeting place of five states, most of them the successors of empires: here are the fantastically intertwined borders of the Soviet Union, China,

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India, Pakistan, and Afghanistan. A single mountain peak may conceivably look down on territory belonging to all five of them.

Far away, on the western margin of the Eurasian land mass, and even farther removed from the Pamirs in kind than in distance, is another small area that has had great political moment throughout history. This is "the cockpit of Europe," the area of the Low Countries where many of history's greatest battles have been fought.

These two areas are opposites in almost every conceivable way. The one occupies one of the highest, the other one of the lowest, inhabited spots on the earth's surface. The one consists of mountains surrounded by mountains, which in turn are all but surrounded by deserts, and is far removed from the centers of civilization; the other consists of a fertile countryside at the very heart of western civilization. The one is among the least populated areas in the world, the other among the most populated. Nowhere is the contrast between the two areas greater than it is with respect to transportation. To reach the Pamirs, and to move about among them, requires hardihood of the most extreme kind, whereas the flat Lowlands, occupying the deltas of the three greatest rivers of western Europe—the Rhine, the Meuse (or Maas), and the Scheldt—lie at the focus towards which west-European movement naturally trends.

The political significance of these two areas is correspondingly different. The Pamirs constitute one of the most formidable barriers to movement upon the earth's surface. Before the air age they could be reached only by land, and only after arduous marches over desert and mountainous wastes, so that land-based empires, which had their centers of energy thousands of miles away, found themselves brought up short once the Pamirs were reached. By contrast, it has been the easy accessibility of the Lowlands, by land, river, and sea, that has given them their prominence in the historical record.

To control the Lowlands can mean a great deal, and this factor is an explanation for the small size of the political entities that do control them—for no large European power could long afford to see the mouths of the rivers that drain most of the continent in the hands of a large rival power. And yet political control of the inhos-

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pitable Pamirs is also fragmented; for, since they constitute the limit to which empires encroaching from all directions *could* extend, they are the limit to which the successor nations of the present day *do* extend, and each sends out questing fingers into the physical barrier, up the river valleys and across the high passes, until brought up short by the political barrier set up by the nation that has reached the same point from another direction. Hence we have the intertwining boundaries of today, and the continuing disputes over them (as in nearby Ladakh, for which India and China contend, and the recurring controversies between Afghanistan and Pakistan over the Pathan country).

Contrasting as these two areas are in almost every other respect, therefore, they have this marked political similarity—that neither has for long been entirely within the control of a single imperial power. Though transportation has played opposite roles in each area, it has undoubtedly been one of the factors accounting for this similarity.

This study in contrasts suggests that the subject of barriers and corridors abounds in complexities. The discussion that follows must necessarily be greatly simplified, and it would be well to remember this: the reader will surely be able to think of many extensions and exceptions to almost every generalization that will be proposed.

NATURAL BARRIERS AND CORRIDORS

Barriers may be altogether insurmountable, as the high seas were to the ancients or the Northwest Passage of the Arctic seemed to us until recently, or they may be surmountable only after the expenditure of an inordinate amount of money or time. In economics it is monetary cost that is considered the most important barrier to movement, whereas the expenditure of time is important chiefly in the sense that "time is money." In politics the scale of values is reversed, with time becoming the more important element. When political exchanges degenerate into war, time is the consideration that overrides all others.

The first and greatest of all political barriers has been the sheer

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size of the earth, when measured on the human scale. Even if the surface of the earth had offered no specific obstacles to movement—even if, for example, it were all a smooth, easily traversed plain—the time it took to move thousands of miles from an administrative center would have made it immensely difficult to patrol farflung boundaries or to enter into co-operative agreements with administrative centers on the other side of the globe.

But the surface of the earth is not uniform, and the first distinction to be made is that between the continental land masses and the bodies of water that surround them. This is also the first distinction we shall have to make later, when we deal with the origin of empires, for the most fundamental geographic (and military) distinction to be made here is that one type has been based on land power, the other on sea power. It must be emphasized, however, that an empire may be of one type at one time, of the second at another time, or, rarely, of both simultaneously.

In the present context the most important difference between land and sea is that of the intrinsic ease of movement. It has always been easier to move through water than on land, given favorable currents of air or water. Translating the relative ease of movement on sea and land into economic terms leads to results of great political interest. William Bunge, a mathematical geographer, has suggested that, since travel by sea costs about one-tenth as much per mile as travel by land, New York is closer in cost-distance to London than to Denver, and the achievements of the Chinese in exploring the vast land stretches of Asia were greater than those of Magellan, who took the easy way around the world by sea. The "far flung" empires, says Bunge, prove much more compact if the water distances are shrunk to one-tenth. His most interesting observations concern the tendency for peninsulas to be split down the middle like a frankfurter bun (think of Norway and Sweden, Argentina and Chile), which he explains by the simple shrinking of sea distances relative to land.

If the continents were uniformly distributed on the globe and all were, like Australia, freely circumnavigable in all seasons, there

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would be no difficulty in moving from anywhere to anywhere on the oceans of the world. But most of the land masses are found in the northern hemisphere, where accordingly most politically significant movement takes place, and their extensive northernmost coasts are rendered virtually inaccessible to water-borne movement, because the frozen Arctic is impenetrable to all but specially designed ships and, in these days, nuclear submarines.

Further, the northern land masses are joined with the land masses of South America and Africa, which extend far into the southern hemisphere, and thus further break up the continuity of water-borne movement.

Topological Insights. At this point it will be useful to introduce some concepts borrowed from a most fascinating branch of mathematics, *topology*. In topology the size and shape of a geometric figure mean nothing: a triangle as tall as a steeple is exactly the same as a circle the size of a dime, as is any other geometric figure, no matter how complex in shape, that can be drawn with a single line that does not cross itself at any point. (Interestingly, topology had its origin in a problem in transportation, for the great mathematician Leonhard Euler founded it, in 1735, when he solved the problem of the Königsberg bridges.[1]) The fundamental theorem of topology is that of Jordan, "a wonderful theorem," say Kasner and Newman, "because it is so simple, so unassuming, and so important." Jordan's theorem states that *"Every closed curve in the plane which does not cross itself divides the plane into one inside and one outside."*

The concept of "inside" and "outside" makes topology directly applicable to a study of transportation and politics. Indeed, it may be stated as a proposition that:

1. The geographic relations between transportation and politics are to a large extent topological, from which it follows that

[1] Seven bridges connect two islands with each other and with the two banks of the river in which they lie. It is impossible to start walking at any point, cross each bridge once, and return to the same point. Why? This and other problems in topology are entertainingly described by Edward Kasner and James Newman in *Mathematics and the Imagination,* Simon and Shuster, New York, 1952, in a chapter titled "Rubber-Sheet Geometry" (pp. 265-298).

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2. In transportation and politics, the greater the topological significance of any element of either, the more radical the effect on the other.

Thus, an island occupied by two countries consists of two topologically distinct parts; the boundary between them makes each country's "inside" the other's "outside." A railroad contained wholly within one country has relatively little topological significance, whereas once the boundary is crossed this significance is great; and of course the same is true politically. Both topologically and politically, the critical point on the railroad is the one where it crosses the international boundary.

Similarly, a province that is wholly enclosed within a nation's boundary is part of that nation's topological unit: it has the same "inside" and the same "outside." If it is an exclave—that is, if it is separated from the parent nation by part of another nation—it is topologically distinct. Any transportation links between the two parts are forced to cross two separate boundaries with the "outside" to get from one "inside" to the other, and again this crossing gives rise to political consequences that are of great significance. The reader will have no difficulty in thinking of apposite examples.

To return to our continental land masses: each of them is enclosed by a continuous line, the boundary between land and ocean. Topologically, there are only four continents: Antarctica, Australia, America North and South, and Africa-Europe-Asia (Afeurasia). In terms of shipping, the latter two gigantic land masses are effectively one, for the solid winter ice of the Arctic may just as well be land, as far as ships are concerned. (An interesting complication is brought in by the nuclear submarine, for, like the airplane, it introduces the third dimension, forcing us to think of the topology of solids rather than of surfaces and thus creating an entirely different situation. It is true, also, that icebreakers are now able to force their way through the Arctic ice, but they are in effect creating their own canals, which in this respect are no different from those other transcontinental canals that we are about to discuss.)

Paradoxically, in view of the non-significance of shape in topology,

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it is precisely their shape that has made it possible for man to effect radical changes in the topology of the earth's greatest land masses, America and Afeurasia. In both cases two vast shapes are connected by a thread, and when that thread is cut, the two are separated. Suez and Panama have each created two "insides" where only one existed before, drastically reducing the effectiveness of the continents as barriers to water-borne transportation. (See Figure 3.) The overriding political significance of this change need not be labored. Mention of the Suez crisis of 1956 is a sufficient reminder of this significance.

Physically impressive as are those other canal systems, the St. Lawrence Seaway and China's Grand Canal, their topological effect is by comparison insignificant, though the Seaway does perform the very important function of extending the coastline of North America deep into the continent's "inside." While the political importance of Suez and Panama cannot be exaggerated, that of the Seaway or of the Grand Canal is of an altogether lower order.

The Oceans. Although the energy required to effect movement is far less on the ocean than on land, this differential is by no means the whole story. A political fact that has made the seven seas one indivisible corridor, where the land surfaces demonstrably are not, is that all land (aside from Antarctica) belongs to somebody, whereas the seas belong to no one or to everyone, depending upon what aspect of them is under consideration. That is, the physical "insideness" of the continuous watery globe is complemented by a political "insideness," and there are no political boundaries the crossing of which imposes topological difficulties on transportation.

But the sea too has its barriers. Again sheer size was for millenia an insurmountable barrier, and only after men had learned to establish their position and direction of movement on the trackless, featureless wastes of water was purposeful, repeatable pelagic exploration possible. Only then could nations extend their political power beyond the watery horizon.

Winds. The oceans are not, of course, altogether trackless. The prevailing winds, such as the Westerlies of the North Atlantic and the Trade Winds of lower latitudes, together with such constant

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NATURAL AND MAN-MADE WATERWAYS OF STRATEGIC IMPORTANCE

Figure 3

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ocean currents as the Gulf Stream, provided paths that, once they were discovered, allowed sailors to use them repeatedly as corridors of movement. Sometimes this has led to surprising political results, nowhere more so than in the Philippines. Though these islands are ten or more times as far from the American continent as from the Asian, they lie in the direct path of the Trade Winds blowing across the Pacific from the former, and it was by following the Trades from their colony in Mexico that the Spaniards reached them four centuries ago. The chief external influences on the Philippines have come from this direction ever since.

Usually the pelagic sailor had to choose his wind patterns, crossing in one direction with the help of one set of winds, in the opposite with another. Thus, before the Suez Canal was built, the Dutch traveling to and from their colonies in the East Indies followed a circular wind pattern, using the Westerlies in their trip from South Africa to Australia and thence to Java, and the Trades from Java back to Africa. Sometimes the wind blew constantly from one direction and there was no reverse wind available, in which case travel was quick and easy one way, slow and difficult the other. The most famous wind of this sort had a powerful bearing on ancient history. It was the Etesian (annual) wind of the Aegean Sea, the summer northerly, known to the modern Greeks as the *meltémi*. This wind also blew in the eastern Mediterranean, in the Black Sea, and most importantly, *up* the Nile River. The constancy of the Etesian wind helped civilization make its early start in Egypt, for it made the Nile a convenient two-way corridor: Egyptians could move easily on the Nile in both directions, drifting downstream with the current and allowing the Etesian wind to blow them upstream again. Much later, it helped to bring ancient Athens to her eventual downfall, for the need to buck the wind in the northward passage caused her to lose her transit trade to other, more convenient, ports.

Sometimes it was the winds themselves that changed direction. The most notable example is that of the monsoons, which blow across the Indian Ocean from the southwest in summer and from the northeast in winter. The political decline of Egypt that began at

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the end of the third century B.C. was for a time arrested with their help. Egypt, having lost control of the caravan routes from the east, was left with only the trade on the Indian Ocean and the Red Sea. But, since Egyptian sailors were forced to hug the shores, and since these were in the control of hostile Arabs, Egypt was reduced to the state of having almost no foreign trade at all. When, about 120 B.C., the Egyptians learned of the monsoons, they gained a straight, quick route across the open sea to and from India, a route that was relatively safe from attack, because the warships and pirate craft of that day were too light to venture far from shore. Egypt was now able to compete successfully with the overland caravan routes, and her revived economy allowed her to regain her political viability.

Increase in human knowledge mitigated the adverse effects of contrary winds very early, turning them from obstacles into assisting forces. But even today the wind must be taken into account, and not only by ships. Jetliners flying the 3,000 miles across the Atlantic Ocean will go 500 miles out of their way to take advantage of favorable pressure patterns, for what they lose in distance they more than make up in time—and, therefore, in money.

The Air. Even more than the sea, and for a much longer time, the air as a medium for transportation remained an impenetrable barrier. As such, it played no part of any kind in the political affairs of the world. But shortly after this barrier was penetrated, it was demolished absolutely, and along with it (for certain political and military purposes) *all* physical barriers to movement from one point on the earth's surface to all others. The transformation from absolute barrier to absolute corridor has transformed political realities, with consequences that we are still trying to assess.

Up to this point we have dealt with the macrogeographic aspects of barriers and corridors—the features of the earth's surface and its watery and gaseous envelopes taken in the large. Before turning our attention to features that on this scale (if on few others) may be considered microgeographic, let us mention one more macrogeographic barrier to movement—the most surprising, and yet the most universal, of all: the light of the sun. Like animals that forage, and

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are hunted, only at night, so do men use the cover of night for much of their military movement. When there is no night, as in the Arctic summer, then movement can become excessively dangerous, as Allied convoys to Murmansk learned to their cost during World War II.

Islands. Island—isolated: the parallel is exact. The Latin word for "island," *insula,* is the root for the word *insulatus* from which "isolated" is derived. From the standpoint of transportation and politics, it is this parallel that is the most significant single fact about islands. The almost complete isolation from the rest of the world that the Tokugawa Shogunate was able to impose upon the islands of Japan for two hundred years comes to mind.

The above example suggests that the factor of isolation is perhaps more important psychologically than it is physically. For islands are, in fact, the opposite of isolated, in that they may be reached from other lands by water, historically the most convenient means of transportation. True physical isolation is much more characteristic of such a place as Huñza, a tiny state in the Karakoram Range touching the Pamirs. (Even this isolation was threatened a few years ago, when it was thought that gold had been discovered there. The Hunzans were alarmed, for they were sure that if they became rich some country would find a pretext for moving in and "protecting" them. Fortunately, there was no gold.)

Psychological isolation is even better exemplified by England. The famous headline in the London *Times,* "TERRIBLE GALE IN THE CHANNEL—CONTINENT ISOLATED," is one case in point; the history of the proposed Channel Tunnel between England and France is another. When, eighty years ago, the British promoter Sir Edward Watkin was making his strenuous efforts to have the tunnel built, it was the psychology of isolation that finally defeated him. The French, accustomed throughout their history to long land frontiers, were by no means worried about having a British army march through the tunnel to attack them, but the island British were not so sanguine. "Perpetual panics and increased military expenditure are the natural result of such a change as will con-

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vert us from an island into a peninsula," said *John Bull,*[2] striking the popular note.

The tunnel project has recently been revived, and there is a very good chance that Britain will be linked with the continent by either tunnel or bridge before many years pass. One no longer hears of the military danger, for "perpetual panics and increased military expenditures" have already overtaken the British without it, as they have overtaken almost all the rest of the world. Topological considerations have not lost their importance, but they are taking a different form. Now that the third dimension has been added to movement, the flat, two-dimensional topology no longer serves, and this fact is perceived psychologically.

In terms of transportation, an island's "inside" differs from its "outside" in that the medium for the one is land; for the other, water. Any two-dimensional transportation must therefore experience a "break-of-bulk," a transshipment from one type of conveyance to another. The psychological sense of isolation that the British have for so long experienced has this fact at its root, for here is the reason for the notorious difficulty of amphibious warfare. At this topological boundary the dynamics of warfare completely change. During those moments when military movement shifts from one type of conveyance to another, the dynamic that has brought the armed forces so far disappears, and in this static condition they are more vulnerable to attack than at any other time.

The success of the Allies in amphibious warfare during World War II, the invasion of Sicily and Italy, the Normandy landings, and the island-hopping in the Pacific owed a great deal to the introduction of the third dimension in military movement. Bombers flying over their targets and ships standing well off shore were able to transport destructive power in massive quantity across the two kinds of topological boundaries—between sea and land and between air and land—without the need of transshipment: shells and bombs in flight are not affected by such boundaries. But the two military

[2] Quoted by Thomas Whitehead, in "The Tunnel in the Chalk—II," *The New Yorker,* November 25, 1961, p. 105.

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organizations specifically created to cross these boundaries, the marines and paratroopers, suffered heavy losses at the moment when they were crossing them, for then they were effectively immobilized and virtually helpless.

The accident of position may do much to dissipate even the psychological feeling of isolation in an island. The island of Sicily, standing in the Narrows between Tunis and the toe of Italy, virtually makes two seas out of the Mediterranean, two seas with different histories, in both of which Sicily has been much involved. Nearby lies Malta, at the point in the Mediterranean where the most important north-south and east-west routes cross. In consequence Malta has had little opportunity to experience the feeling of isolation.

On the other side of the Atlantic, the serpentine chain of the Greater and Lesser Antilles forms the northern and eastern bounds of the Caribbean Sea; ships passing through the Panama Canal and into the Atlantic must negotiate a narrow gap between one pair or another of these islands, and in hostile hands the chain could prove a danger to any power relying upon Panama for its safety. The westernmost of the Antilles is Cuba. The fact that it stands squarely in the middle of the entrance into the Gulf of Mexico, in the gap between Yucatan and the Florida Keys, is a source of discomfort to the United States now that the island is Castro's Cuba. Even in the age of the intercontinental ballistic missile such considerations retain strategic importance, if only for their psychological impact.

Mountain Ranges. Mountain ranges are the most prominent of barriers. They look the part—like a wall. Frequently they act the part, especially in Asia, where the Himalayas have cut off the subcontinent of India from contact with the vast continental expanse to the north, except for the trickle of movement that crossed over the relatively low spots, such as the Khyber Pass; and where China was able for many centuries to lie undisturbed behind the mountains in Kansu, Szechwan, and Yunnan.

Despite their undisputed effectiveness in obstructing movement, however, mountain ranges may on occasion encourage it. They do

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so when one side of the range provides conditions for producing something that the other side lacks—as, for example, when there is a rain forest on one side, a rain shadow on the other. It may be difficult to travel between the two sides, but if the desire for economic interchange is great enough the difficulty will be surmounted. On the North American continent mountain ranges have not for long remained political barriers, and in every case national boundaries cross such ranges instead of paralleling them.

Where national boundaries do parallel mountain ranges, the two types of barrier, political and physical, reinforce each other, and boundaries are relatively stable. But wherever there are corridors through the mountains, particularly if they are river valleys, and boundaries cross them, then there is trouble. Douglas Jackson has pointed out this fact in an earlier volume of the present series, and added that the most vulnerable part of the entire Russian frontier with China lay in the Inner Asian sector, where the boundary crossed a whole series of such corridors.[3]

Vegetation and Climate. The interaction between vegetation and climate creates a great variety of barriers and corridors for movement, particularly when extreme conditions are reached. The jungles and papyrus swamps of the interior of Africa, the jungles of South America and Southeast Asia, the Pripet Marshes in Eastern Europe, the deserts of Asia and Africa have each contributed to the economic backwardness of the areas that contain them, have each had the opposite effects of helping invite aggression from without because of this very backwardness and of helping repel such aggression because of the difficulties they posed for transportation.

The presence or absence of vegetation, and its type, have shaped the media of transportation. It is believed that the first people to have fought on horseback were not, as might have been expected, the people of the grasslands (such as our own cowboys and Indians), but those of the mountains and forests, where the war chariot could not be used. Grasslands could be crossed at will, and almost

[3] W. A. Douglas Jackson, *The Russo-Chinese Borderlands,* Van Nostrand Searchlight Book #2 (Princeton, 1962), p. 9.

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the only determinant was the availability of water. Similarly with deserts, where the determinant has always been the location of oases. Large-scale movement through forest has required the clearing of right-of-way for a road, and through swamp, the laying of a firm foundation. In either case heavy wheeled traffic has required the construction of roads of a high quality. Even to this day it has proved impossible to construct long-lasting roads through certain jungles—notably in Southwest Asia, where the Burma and Ledo roads, constructed with so much effort during World War II, have in large part disappeared under new growth. No doubt, if there were sufficient incentive the roads would be properly maintained, but the jungles themselves contribute to the lack of incentive.

Deserts have had the unexpected result of providing barriers to travel by *sea*. Before the time of Prince Henry the Navigator, mariners coasting down the western side of Africa rarely penetrated beyond Cape Bojador and the "Ocean of Darkness." One reason was the myth that the boiling waters flowed over the edge of the world at that point and no ship could ever sail back. (As we shall see in the following chapter, the prevailing northerly wind had also something to do with this, and only with improvements in the type of ship known as the *caravel* was it possible to overcome this difficulty.) It was the Sahara, however, that posed the chief barrier to coastal navigation, because it provided no place where the little ships could put in for fresh water and food. Similarly, on the western side of South America, the Humboldt Current reinforced the effect of the Andes in creating a coastal desert, which the Incas of Peru found a much more effective obstacle to dominion over the sea than over the land.

Rivers. Rivers have always had immense political importance, in a great variety of ways. It will accordingly be necessary to discuss them in greater detail than any other of the earth's features.

In a sense rivers transport themselves, and it makes a very big political difference whether they do so entirely within the bounds of a single country, or form the boundaries between two or more countries, or flow through first one country and then another.

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Rivers look so unambiguous on a map that eighteenth-century negotiators had a predilection for running international boundaries down the middle of their beds. There is your line; make a boundary out of it. Modern conservationists know that things are not nearly so simple, and what matters is not the line of the river itself, but the whole watershed that the river drains. It is because this principle, which now seems self-evident, was disregarded by early boundary makers, that a great many economic and political troubles have since been experienced.

Many of the difficulties that Canada had to face in her early years had their origin in just such boundary making. To run the international boundary between Canada and the United States down the middle of the St. Lawrence River, and continue it in the same way throughout the Laurentian system of Great Lakes, seemed an eminently sensible procedure. And in certain ways it seems so still, for in the process both countries were given access to the very heart of the continent by this remarkable system of waterways. But the effect on the economy of the young Canada was catastrophic, for that economy, originally based as it was on the fur trade, used the watershed of the St. Lawrence system as a single unit. When the Ohio Country was ceded to the United States under the Treaty of 1783, that unity was broken, and the economic future of Canada imperiled. Much of the economic and political history of Canada during succeeding decades revolved around attempts to reconstitute the unity of the St. Lawrence watershed, and in this process the preponderant role was played by the rivalry between the St. Lawrence and another river system, that of the Hudson. The latest phase of this rivalry has been the construction of the St. Lawrence Seaway, among whose most vigorous opponents were the legatees of the earlier victory over the St. Lawrence won by the Hudson River, especially the City of New York.[4]

When a river, instead of forming an international boundary,

[4] For details of this rivalry see R. I. Wolfe, "Transportation and Politics: The Example of Canada," *Annals,* Association of American Geographers, Vol. 52 (1962), pp. 176-190.

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crosses one, then again there is trouble. A river transports itself and every movable thing that is in it or on it. If the upstream nation dams the river, so that only a trickle of water reaches the downstream nation, and if the latter has relied on the river to supply a significant proportion of its transportation needs, what resort can the latter have? Or what if the water that reaches it has been badly polluted by chemical effluents from industry within the upstream nation? Further, what about navigation rights, especially for a landlocked country whose only access to the sea is a river that has its mouth in another country? And what if a nation, wishing to exploit the potential for hydroelectric power of a river, erects a dam across it so high that the lake backing up behind it floods lands across an international boundary?

All these questions suggest that the politics of rivers are extraordinarily complex. They suggest that it is no easy thing to decide whether, or when, a river or a watershed acts as barrier or corridor. On the whole, it may be said that a river is likely to act as a corridor to water movement and a barrier to land movement, but even this statement may not stand unmodified. When rivers cross mountain ranges, the passes they create form the most convenient locations for paralleling roads; that is, the rivers here act as corridors for land movement instead of barriers. And wherever there are impassable rapids or falls, the rivers throw up barriers to water movement that have to be by-passed either on land, or by means of canals. It is at such discontinuities in rivers that many of the earth's great cities have developed. Others have developed at shallow places, where the river could be forded. Still others, and these the very greatest, have grown up near the mouths of rivers, at the furthest point upstream, usually, that ocean vessels can penetrate. In every case the chief factor has been a critical change in transportation. Some sort of transportation boundary must be crossed; again the topological element enters, and again the political significance is great.

Urban centers growing up in this way eventually dominate their immediate hinterlands. They become the centers of power that con-

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trol ever larger areas, and in time, other factors being favorable, they may become the seats of empire. With very few exceptions, however, the beginnings take place on the banks of a river, at a point where there is some kind of discontinuity in transportation. In Asia, Peking is the only notable exception to this generalization. In Europe there is none. Mexico City and the Cuzco of Inca Peru are the only others that come to mind.

Lewis Mumford has suggested that the ease with which rivers can be turned into barriers, as when one community denies passage to boats serving other communities, may account for "the tendency of powerful cities to extend their frontiers and to destroy cities that might block their trade routes: it was important to safeguard the 'life lines.' This would partly explain the political route from urban center to empire." [5]

No attributes of rivers are of greater political moment than the direction in which they flow. Much of the history of Siberia is explicable from the fact that, except for the Amur and the rivers of central Asia (if, indeed, the latter can be thought of as Siberian), its major rivers all flow into the Arctic. The river mouths, which in more hospitable climates have harbored the capitals of nations and empires, have here had to go unused until very recent times. The rivers flow *away* from centers of civilization rather than towards or among them, and they have acted as barriers to the east-west land movement of culture, rather than as the corridors they might have been.

The projected attempt by Soviet engineers to implement the "Davidov Plan" for diverting the Ob and Yenisei Rivers may therefore have consequences commensurate with the effort, which will be colossal. Dams are to be constructed across these rivers, a deep canal is to be cut through the Turgai Gate, which is on the continental divide, a huge inland sea is to be created, and the rivers will flow south into the Aral Sea instead of north into the Arctic. How really colossal this plan is can be gauged from the following

[5] Lewis Mumford, *The City in History,* Harcourt, Brace, and World, New York, 1962, p. 72.

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set of figures: To construct the St. Lawrence Seaway required the moving of 210 million cubic yards of earth; for the Panama Canal, which was plagued by recurring landslides in which mountains of earth fell into the cut and had to be removed, the moving of 262 million cubic yards; for the Turgai Gate alone, 23,500 million cubic yards of earth will have to be moved—on the order of 100 times either of the others. The effects on the Soviet economy promise to be great—new hydroelectric power not far short of the total present output in the United States, reclamation of nearly 100,000 square miles of fertile land through irrigation, perhaps radical improvements in the climate, brought about by creation of the huge new inland sea. The political effects are likely to be on a similar scale, for the knitting together of Soviet transportation by these waterways will put formerly isolated areas in the mainstream of modern life. The system of canals thus created may eventually form part of a bi-continental system, over which it will be possible to take a ship from the Atlantic to the Pacific, passing *through* the continental land masses of Europe and Asia en route.

Should this ever happen, the historical effect imputed to Russian rivers, no less than to those of Siberia, may be reversed. The rivers of European Russia run southeast, away from the centers where western civilization has flowered, and it is to this fact that Arthur H. Dean has attributed some of the political difficulties with Russia that the West has been experiencing, for it has led, he believes, to Russia's having a different conception about international law than have the western European countries, which have grown up under the influence of Roman law and the Greco-Roman civilization.[6]

According to Rhoads Murphey, the fact that a score of major rivers flow across the great European plain, free from floods, silting, and ice, when added to the mobility conferred by Europe's strongly indented coasts, had much to do with the dynamism of European

[6] Arthur H. Dean, Head of the American Delegation at the Geneva Conference on the Discontinuance of Nuclear Weapons Tests, in a lecture to the International Law Commission at Geneva, May 15, 1961. (Quoted by Daniel Lang in *The New Yorker,* July 22, 1961, p. 59.)

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cities, which eventually led to the acquisition of vast overseas empires. He contrasts this dynamism with the static quality of Chinese cities, which again he attributes in part to the character of the river system.[7]

Though we shall have occasion later to modify this view (see pages 59-64), we must agree that the directions in which European rivers flow have indeed had a powerful bearing upon European civilization and politics. We restrict ourselves to one example, that of the Rhone River. The Rhone has been called the "Way of Light," because many of the civilizing influences originating on the Mediterranean have found their way up it into the heart of central Europe. Note that this is the *only* considerable river giving access deep into Europe from the Mediterranean. Here is an explanation for the historically crucial fact that the Mediterranean in ancient times had no significant hinterland; movement by sea was so much easier than movement by land that the shores of the Mediterranean were all conveniently linked with each other, but had few links with the lands beyond the shores. Civilization spread itself around the Mediterranean; away from it were the barbarians. North of the Mediterranean, and usually at only a little remove from its shore, are almost continuous mountain ranges, with few natural passes between them. Of these the Rhone is by far the most convenient, and it is up the Rhone that the fruits of civilization spread into the lands of the barbarians.

The directions in which the rivers of the United States flow have had their bearing on her political history. Before the coming of the railroad, the American West was tied to the South by virtue of the fact that the Ohio and the Missouri are tributary to the Mississippi. The east-west railways had by 1860 virtually overcome this north-south alignment, and this rupturing of former ties was undoubtedly one of the antecedents to the American Civil War.

Another north-south river posed a threat to Canadian viability as

[7] Rhoads Murphey, "The City as a Center of Change: Western Europe and China," *Annals,* Association of American Geographers, Vol. 44 (1954), pp. 349-362.

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a nation. This was the Red River of the North, which channeled the trade from the Canadian west southward to the Mississippi. Here again, as will be seen in the following chapter, the railroad was effective in shifting interrelations from the north-south to the east-west direction, with the opposite effect: Canadian unity was enhanced rather than impeded.

Our final comment upon the politics of rivers is the most fundamental one: political activity itself very likely originated not only on rivers, but because of them. For this insight we are again indebted to Lewis Mumford. These moving belts of water, says Mumford, were the first highways once boats were invented. The earliest civilizations were all river civilizations. Mesopotamia made use of a moving belt of water 600 miles long; Egypt, of a belt 1,000 miles long. Their sudden floods made it necessary for the village cultivators to band together to repair storm damage, to guide water to the fields in times of drought, and finally to create a whole network of embankments and canals. Precisely the same sequence of events occurred in ancient China, in the cradle areas of the Huang and the Wei Rivers. These activities demanded a high degree of social intercourse, of co-operation and long-range planning;[8] in a word, the beginnings of political organization. To the present day navigable rivers continue to be kept under the direct surveillance of the highest levels of government in a nation, even when other, more recently developed means of internal transportation have escaped from such surveillance.

ARTIFICIAL (POLITICAL) BARRIERS

The most obvious political barrier is the international boundary. It supersedes all others, and, as long as a nation is a viable entity, no natural barrier to the interaction of peoples can be as effective. This situation is only to be expected. Natural barriers remain so only as long as technology has not advanced far enough to overcome them; they are barriers without motive, whereas political boundaries are purposive barriers.

[8] Mumford, *op. cit.*, pp. 56-57.

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Unless a country wishes to isolate itself completely from its neighbors, it must provide points of contact at intervals along the otherwise inviolate boundary. Here are situated customs stations and immigration officials. The importance of these points of contact in a nation's life is attested by the fact that a large part of the statistical information by which the nation charts its economic and demographic health is gathered at these stations.

The border towns that grow up around these stations, or that have been in existence previously and have been modified by their new guardianship of the border crossing, exhibit certain characteristics peculiar to their kind. They necessarily act as funnels, concentrating the traffic from wide areas on both sides of the boundary at one permitted crossing point. Where the boundary is a river, there are frequently two towns at the crossing point, one on either side of the boundary, and with one member of the pair dominant. At friendly boundaries this dominance may become so pronounced that one city is as much a member of the other's hierarchy as though it were in the same country. Indeed, the dominance may extend well away from the boundary into the neighboring country, as Lösch has demonstrated for El Paso, a Texan city on the Mexican border.[9]

At an unfriendly boundary, particularly a newly created one passing through an area with a well-established economy, the effect can be severely disruptive, and the symmetrical pattern of an urban hierarchy destroyed. The cities of Silesia have undergone such an experience several times, most recently after World War II when, for example, the German city of Breslau became the Polish city of Wroclaw and its area of dominance was shifted towards the east.

Railways. Transportation media, most notably the railways, can themselves be designed to act as barriers to interaction. The standard gauge of the western world, 4 feet 8½ inches (which some say dates right back to Roman times, when that was the length laid down in military manuals as the double marching step for the Roman legions), makes it possible for trains to pass freely across the

[9] August Lösch, *The Economics of Location,* Yale University Press (New Haven, 1954), p. 448.

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boundaries of Western Europe, of the Americas, of parts of Asia, and now, at last, of the provincial states of Australia. (I say "at last" because until recently the fierce regionalism of the Australian states found expression in a variety of gauges, which hindered easy communication among them.) The Soviet Union still retains its wider gauge, in a continuing expression of Russian political apartness.

Another, more subtle way in which one nation may manipulate rail movements to the detriment of another is by means of discriminatory tariffs. In the period between the World Wars, Germany made extensive use of such tariffs. By this artificial means she shifted trade to her own ports on the North Sea from the hinterlands of other nations' ports on the Baltic and Adriatic, strengthening her own political position, weakening those of Poland, Czechoslovakia and Austria, and all but obliterating the free cities of Trieste and Fiume.

Canals. Even a structure meant to facilitate movement of one kind can impede movement of another. This is notably true of canals. Panama and Suez *join* the oceans, but they *cut* the continents, and to travel on land from one to the other of a pair of continents that were formerly joined, man is forced to construct bridges across the canal. Bridges, whether they cross rivers or canals, have great topological interest, in that travel between two points on opposite banks, separated in actual space by only a few dozen yards of water, may require land travel of tens or hundreds of miles, depending on the distance to the nearest bridge. In time of war the capture of bridges before they can be destroyed by the fleeing opponents is a prime objective of attacking forces.

Air Space. Nowhere do artificial land boundaries cause greater complexities than in the air. In spite of the fact that no visible boundaries can be drawn in the air, or perhaps because of it, we have become familiar with the complaints of one nation that another was "violating its air space," and planes have been shot down in consequence.

There is one form of violation of air space that is completely un-

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controllable, given certain antecedent events, and that makes a mockery of national boundaries. Here the winds of the upper atmosphere act as the transporting agents, and the transported material is radioactive debris from nuclear explosions. It is each country's and each man's inviolable right to breathe unpolluted air, a right recognized by governments when they prosecute offending industries. But what of inviolable rights when involuntary motion enters the picture? The problem of nuclear fallout in time of peace is one of the most intransigent that the tangled relations between transportation and politics in the modern day give rise to, all the more so since no human agency is involved in the act of transportation.

"Sea Space." On the sea, beyond agreed-upon offshore limits, there is no question of violating any country's "sea space," for there are no extensions of land boundaries beyond those limits. Even so, attempts have been made to extend a nation's sovereignty over all the seven seas by means of Navigation Acts. If the sea itself is free to all, the ships sailing them are not. This fact was used by England as early as 1381, long before she became a naval power, when she passed her first Navigation Act, which made it an offense to ship merchandise out of England in any but British bottoms; the last such English law was not repeated until 1854. For a period of nearly half a millennium England exerted a form of political control on far-flung transportation lanes, a form that finds an echo in the present day, in the United States ruling that American grain intended for foreign aid can be carried only in American ships. This is a much more drastic ruling than that governing cabotage, which provides that goods moving between two ports in a given country must be carried in ships belonging to that country. Such rulings are widespread, in that many countries have made them, but they are narrowly restricted in scope, for no voyages between country and country are directly involved.

In time of war, artificial barriers are erected where the maximum effect may be obtained with least effort. Such a barrier was Thermopylae, the narrow defile where Leonidas and his handful of

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Spartans delayed the Persian host. By far the most numerous of such barriers, however, are the blockades of nearly landlocked seas and of narrow straits. History abounds in such blockades: at the eastern end of the Mediterranean, where the narrow Bosporus and Dardanelles, which give exit to the Black Sea, are easily closed (the siege of Troy is thought to have been due less to Helen's charms than to Troy's habit of blocking the Dardanelles); at the western end of the Mediterranean, where Gibraltar has become the symbol of guardianship; at the Straits of Bab-el-Mandeb, the entrance to the Red Sea, whose closing by the Abyssinians in the sixth century made the silk trade a monopoly of the caravan-controlling Persians; in the English Channel, where, in the sixteenth century, English privateers were as bad as the corsairs of Tripoli, so that Antwerp and Hamburg were closed to English shipping, and where a few years later the Spanish Armada met its defeat; and in the Strait of Tsu Shima, south of the Korean Strait, where the annihilation of the Russian fleet by Admiral Togo decided the outcome of the Russo-Japanese War of 1905, and perhaps much of our own fate, for the Russian defeat in 1905 was a factor that hastened the coming of the Russian Revolution. The list is endless, but enough examples have been given to show the very great variety of incidents to which blockade of sea narrows can give rise.

Two more artificial barriers to political interaction must be mentioned, and we are done with our discussion of barriers and corridors. Both are intangibles, and consequently they are probably of greater importance than all other factors mentioned until now.

The first is the barrier thrown up by differences in religion and ideology. We are all too familiar with the operation of this factor, which accounts for some of the most unhappy chapters in the story of mankind. Religion has often been one of the greatest stimulants to movement, to interchange, and consequently to political interaction. Crusades, missions, and pilgrimages have caused peoples to intermingle and have promoted the spread of civilizations and of political institutions.

The second intangible is character. None of the barriers and

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corridors on the earth's surface is so effective in promoting or inhibiting political interchange as the amalgam of a people's experiences, reactions to its environment, religion, ideology, and customs, the amalgam that is expressed in that single term. It is the chief reason that a strict environmental determinism is untenable. Character is not immutable, but during the time it is acting in a given direction, it is the one factor most to be reckoned with.

A COMPLEX OF CIRCUMSTANCES

Mountains do this, rivers do that, islands do the other—these are single-factor statements that will do for generalization, but must be guarded against when well-rounded explanations are sought.

How explain, for example, the beginnings of the British Empire? In preparing for battle, wrote Nelson before Trafalgar, "something must be left to chance." Here too we must leave something to chance. We may list the factors, but we may not insist that any one of them, or any group acting together, was determinative. Thus, in assessing the part that transportation played in the beginnings of empire, we may mention the fact that Britain is an island; that her position athwart the warm Gulf Stream gives her a climate favorable at all times of the year for movement, in spite of her high latitude, and in spite of the incidence of fog; that the narrow seas, salty and tide-swept, give her propinquity to the European continent at the same time as they protect her from it; that she is exceptionally fortunate in her coasts, which, with their many deep and safe harbors, are more richly endowed than the coasts opposite her on the continent; and that the chief rivers of Europe entering the Atlantic, pre-eminently the Scheldt and the Rhine, have their mouths close together and directly opposite the mouth of England's chief river, the Thames, and the British Isles as a whole guard the entrance to the Baltic Sea. We may add that these factors are reinforced by the fortunate circumstance of the winds' blowing prevailingly from the southwest, so that sailing ships were able to put out from Britain towards the continent at the same time as continental ships were being held fast within their harbors (a great

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advantage in sustaining a blockade); and that the British learned to take advantage of these factors—making it a cardinal policy to prevent the mouth of the Scheldt and its superb harbor at Antwerp from falling into the hands of powerful adversaries, allowing the wind to blow fire ships towards the Spanish Armada sheltering in Calais Roads, keeping open the Baltic, whence she obtained the timber and cordage for her navy, and so on.

These were some of the pre-conditions of empire inherent in the situation of Britain herself. There were others, elsewhere in the world, and we may list a few of those involving only islands. The capture in 1745 of Cape Breton Island, with its French fort of Louisburg, gave England control of the mouth of the St. Lawrence and helped her win Canada fifteen years later. Ceylon and Minorca were so situated as to make their capture, loss, and recapture crucial elements in establishing England's position in India and the Mediterranean. Similarly the West Indies, Malta, and Singapore were all strategically located in widely separated parts of the world, and all played their parts in the setting up of the imperial pattern.

But here we must pause, for late in the history of empire, the last-named island introduces a note of failure into the catalogue of successes—and illustrates the importance of the unlooked for, the inexplicable, the something that we must leave to chance. In Singapore during World War II, the unthinkable happened: Winston Churchill never asked if the landward approaches to the island were defended, any more than he would ask if the safety of the Royal Family was being looked after; the possibility that either duty might be neglected could never occur to him. Nor, in the minds of the British forces on Singapore, *were* the landward approaches undefended. Within the fortress it seemed that the jungles on the neighboring mainland were a sufficient defense, for they were thought to be an impregnable barrier to military attack in force. And so they might have been, had not the Japanese hastily retrained troops, originally trained for the rigors of Manchuria and Siberia, in the ways of jungle warfare. In a very few months the Japanese had learned to move through the jungle and to win battles there,

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to the immediate dismay and subsequent admiration of their adversaries. A barrier had been turned into a corridor to conquest, and no list of factors proving that such an operation was impossible could change the result.

We are left, therefore, with the conclusion that, however useful a listing of the physical elements leading to success or failure may be, however integral a part transportation may be of the politics of empire, and however important the mere accident of position may be in transportation, in the end no explanation for empire has been attained. Something important has nonetheless been achieved. If transportation, and the physical and psychological elements affecting it, are not the whole story, they are essential elements of it, without which a solid foundation cannot be laid for the explanatory evidence to be built upon.

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3 *Nation and Empire*

THE present chapter and the one following are essentially essays in geopolitics, for geopolitics is more than anything else the study of the relation between transportation and politics, in geographical terms, pursued with the aim of explaining the origin and development of states and empires.

One of the earliest and most celebrated publications in this field, Sir Halford Mackinder's *The Geographical Pivot of History* (1904), deals with nothing else. The flow of history over the millennia is explained in terms of movements by land and by sea, and the realities of modern power (as Mackinder then saw them) are founded upon the same dichotomy. Most commentators on Mackinder's works have stressed his concept of the *heartland,* formulated after the first World War, but have paid less attention to the aspect of his work that most interests us here.

Everything Mackinder has to say in his original essay, all his insights into history and the changing patterns of political dominance, all his predictions—everything has to do with transportation. The westward movement of the nomads across the steppes of Asia, forcing the European peoples to seek shelter in the peripheral forests; the counter-pressure of the Vikings moving inward from the sea; the later movement of the Russians along the same paths as those followed by the nomads, but in the opposite direction—all these are well documented facts that lead to essentially incontestable conclusions. These conclusions are perhaps less exciting than the broad, imaginative generalizations that Mackinder later drew from them; certainly they are less subject to controversy. They form part of our present story.

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THE POLITICAL STATE AND THE EXERCISE OF AUTHORITY

Underlying the existence of every political state is the concept of authority. There must be a single, strong center to exercise authority, either directly or by proxy (through the agency of one or more subsidiary centers), over the whole territory lying within the boundaries of the state. In normal times these links foster the sense of community without which a nation cannot long remain viable; in times of stress they are essential for dealing with internal disaffection or external aggression. But the very transportation links that the capital city depends on for its power cannot exist unless the capital city itself creates them. The political state and the media of transportation stand in a reciprocal relation to each other; the state needs transportation, and transportation needs the state.

The authority emanating from the center must be compelling at the farthest reaches of the state, more compelling than that of any nearby state, no matter how powerful, and no matter how much closer the neighboring state's center of authority is to the common boundary. This statement suggests once again that transportation is not the whole story, but that it remains an element that must not be disregarded.

The difficulties that arise when transportation links are tenuous are most prominently illustrated in very large countries, such as China, whose struggles to retain control over outlying provinces have a long and well known history. But small countries have their difficulties too. Czechoslovakia, prior to the transfer of the eastern province of Ruthenia to the U.S.S.R., will serve as an example. Its capital city, Prague, is situated near the western boundary of this narrow country, which is elongated in an east-west direction. The central and eastern lowlands of Czechoslovakia are physiographically much more closely allied with the connecting lowlands surrounding Vienna and Budapest than with those surrounding Prague. Physiography is reinforced by history, for the railways of Czechoslovakia, a successor state carved out of the defunct Austro-

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Hungarian Empire, were part of a network that was intended to consolidate imperial power, and they focus on the former seats of power, again Vienna and Budapest, rather than on Prague. The lack of unity between the eastern and western provinces that has its origin in ethnic incompatibilities is consequently aggravated by the unsuitability of the transportation pattern. Yet Czechoslovakia persists as a nation.

THE SIZE OF THE STATE

The political fragmentation of Europe is frequently cited to illustrate the proposition that the size of a state offers a clue to the stage reached by the technology of transportation at the time when the state was first established. Again there are a multitude of other factors that must be considered, yet the proposition may be entertained without too many reservations.

The Europe of today is the product of too intricate a history of territorial expansion and contraction to serve our purpose. To see in its purest form the manner in which the technology of transportation has affected the size of the state, we should have to return to the time when there were no European states, to the time when the roads that all led to Rome had lost their function, because there was no longer a Rome (as a center of empire) to lead to. We should have to note that Europe after the fall of Rome could not begin to reorganize into political states, each with its own capital city exercising authority over an extended domain, before the disrupted system of overland transportation was reconstituted. We should have to examine the attempt of the Carolingians, over a thousand years ago, to unite the whole of Europe within one empire and recognize, in their failure to do so, the part played by the continuing inadequacy of transportation. We should then see a Europe divided up among thousands of self-sufficient castles, which would remain impregnable until long-distance transportation became possible. Only when besieging armies could supply themselves with men, food, and materials of war from afar could a castle be starved out, and until this happened the castle could resist any attempt to

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bring it under the control of a central authority. By the beginning of the twelfth century the conditions for successful siege began to appear. Vassals who could be made to serve only a specified number of days in a year, and only two or three days' ride away from home, were replaced by mercenaries who would fight anywhere, for any length of time, as long as they were paid. A reviving commerce, using new techniques in the harnessing of draft animals learned from the East, began to move merchandise to local trade fairs and thus provide the means for moving military supplies. In time the thousands of independent political units were organized into some hundreds of feudal monarchies. With the introduction of artillery, castles became altogether obsolete and power more thoroughly centralized, so that the hundreds of small states became a few dozen larger ones.

Once we had reached this point, we should have seen the beginnings of the modern Europe. We should then be able to understand the full political implications of the revolution in transportation that began about two hundred years ago, when mechanical means of providing motive power first appeared. We should see the many tiny principalities of north-central Europe continue to persist for another century and more, until Bismarck was able to take advantage of the unifying effect of the railroad to bring them together into the one German nation.[1]

Early North American States. Their short and relatively uncomplicated history, which began not very long before the technological revolution, allows the states of North America to offer a striking, because unblurred, picture of the way in which transportation affects the size of a state. No one can have failed to notice how small the Maritime Provinces of Canada and the New England and Middle Atlantic States are, when compared with the provinces and states further west. When the independent colonies that became the Atlantic provinces and states were first settled, in the 1600's, movement was restricted almost entirely to the waterways. Ships sailed up and

[1] To flesh out this skeletal account, see Carroll Quigley, *The Evolution of Civilizations,* Macmillan, New York, 1961, pp. 223-258.

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down the Atlantic coast, and penetrated into the continent along the rivers and up the lakes, but movement away from water through the dense forests was slow and arduous. In addition, the Precambrian Shield in Canada and the mountain ranges paralleling the Atlantic coast further south were sufficiently difficult barriers to the transportation media of those early days to hem settlement in on the riverine, coastal, and piedmont strips. Each center of colonization extended its authority along these strips as far as it could go before it impinged upon the instruments of authority emanating from a neighboring center.

The technological revolution had but recently begun when the American colonies gained their independence and formed a federal government. The new nation, and the one being formed to the north of it, grew as the technology of transportation grew. It was the improvement of transportation media that not only made possible the settling of the lands in the interior of the two countries, but also facilitated the erection of political units much larger than the original colonies. These were not, to be sure, independent nations, but it may be precisely for this reason that transportation could make its effect on size more readily apparent.

In the United States there is a most interesting progression in sizes. The 16 states that were admitted to the Union before 1800 had an average area of almost exactly 25,000 square miles. The 10 that joined between 1803 (Ohio) and 1837 (Michigan), in what might be called the canal period, just before the full effect of the railway made itself felt, averaged about 50,000 square miles (49,600). And the 22 remaining continental states, whose entry (1845 to 1912) coincided with the railway's period of dominance, averaged just short of 100,000 square miles (95,000). Of course, transportation cannot by any means be said to have *determined* the size of these states—deserts, mountains, prairies, all had their effect—but can one doubt that improved transportation had something to do with this progression?

The nation-building potential inherent in all forms of transporta-

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tion was early recognized on this continent. That it was so recognized in the United States is attested by the statement of George Washington: "Open *all* communications which nature has afforded between the Atlantic States and the Western territory, and encourage the use of them to the utmost. . . . Sure I am there is no other tie by which they will long form a link in the Chain of Federal Union."

This recognition underlay the authorization by Congress, in 1806, of the famous National Road. The National Road policy had its origin a few years before, at the time that the Northwest Territory was being settled and the first state was about to be carved out of it and admitted to the Union. This was Ohio, and the Enabling Act of 1802, under which Ohio achieved statehood in the following year, provided that part of the money raised by the selling of public lands there should be used to build roads connecting the navigable waters flowing into the Atlantic with the Ohio River. Similar provisions were included in the acts that admitted Indiana, Illinois, and Missouri to statehood within the next two decades.

The National Road did not long remain a completely federal project, nor did it give rise to a full program of similar projects. Two years after the road was begun, Albert Gallatin presented to the Senate a *Report on Roads and Canals* that was of even greater importance for nation building, for it laid down a program, for the federal government, of constructing a whole network of transportation routes that would have the express purpose of helping to incorporate the lands across the Appalachians within the Union. Very little of this plan was carried out, but it remains of great significance, as providing evidence of a conscious effort to use transportation to build a political state.

THE RAILROAD AS NATION BUILDER

Equally conscious, and far more successful, was the similar effort by the federal government of Canada to use transportation as the

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primary tool for making a continent-wide dominion. This time it was the railroad that was used as the unifying medium. The Canadian nation came into being at almost the same time as the German nation—where also, as we have seen, the railroad acted as midwife. Again, the railroad was concurrently being used in other parts of the world, notably in Asia and Africa, to bring the era of colonialism to a climax, as we shall see in the following chapter. It will be worth our while to examine in some detail the manner in which it was used to help build the Canadian nation, for in the process we shall gain some useful insights into the fundamental interplay between transportation and politics.[2]

The recognition that the railroad was essential to the unity of Canada came very early, within less than a decade of the railroad's coming to North America. In 1839 Lord Durham, who had been sent to Canada to learn the causes of the rebellion of 1837 and to recommend ways of removing them, recommended the union of all the then-existing Canadian provinces, from the Atlantic seaboard to the eastern shore of Lake Huron, and suggested that a railroad would offer invaluable support to such a union. A quarter of a century later, when the confederation of the British North American colonies into one Dominion was under discussion, the Maritime Provinces made it a condition for their joining the union that the Intercolonial Railway, linking Montreal, Quebec, and St. John, New Brunswick, be built. (See Figure 4.) The condition was met, and Confederation came to pass in 1867. Later, British Columbia laid down a similar condition, which resulted in the construction of the Canadian Pacific Railway.

The Intercolonial Railway was uneconomic for almost the whole of its length and throughout the whole of its existence. Its reason for existence was political, and its location—as far removed as possible from the American border—was dictated by military considerations. Its economic failure, though, was more than compensated

[2] The discussion that follows is taken, in condensed form, from my paper "Transportation and Politics: The Example of Canada," *Annals,* Association of American Geographers, Vol. 52 (1962), pp. 176-190.

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CORRIDOR RAILROADS

CANADIAN PACIFIC

CHINESE EASTERN

Figure 4

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for by its political succcess. It did induce the Maritimes to join Confederation and thus achieved its purpose as a nation builder.

Political considerations also caused part of the Canadian Pacific Railway to be built in an uneconomic location. The North American practice of building railroads ahead of settlement could be defended on the grounds that rich new country was being opened up, and once the Canadian Pacific reached the prairies this defense was valid. But east of the prairies lies the rugged, barren Precambrian Shield, whose mineral resources were still undiscovered in the 1870's and 1880's, when the railroad was being built. It was argued that the Shield be by-passed, and the railroad be constructed through the American Middle West, so that the riches of that country might help support it. Had this been done, however, the economy of the Canadian prairies would have been so strongly tied to that of the United States that political ties would almost surely have followed.

Of interest here is the part played by the Red River of the North. The Red River provides a north-south corridor of movement, at right angles to the east-west international boundary along the Forty-Ninth Parallel. For a long time it was the unifying agent for a huge region west of the Great Lakes. Canoes and steamboats plied its waters, and the trails of the famous Red River carts paralleled it. Only an all-Canadian railroad could counteract the pull exerted along this natural corridor.

Social and Spatial Interaction. It will be useful at this point to refer to the concepts of Karl W. Deutsch and Edward L. Ullman, which respectively deal with social and with spatial interaction. In dealing with nationality, Deutsch employs what he calls a "functional" approach. He notes that "political geographers have sought to identify *core areas* around which larger states were organized successfully in the course of history" and adds that "the density that makes a core area is one of traffic and communication rather than mere numbers of passive villagers densely settled on the soil."[3] In another place he specifies, for his functional definition of nationality,

[3] Karl W. Deutsch, "The Growth of Nations: Some Recurrent Patterns of Political and Social Integration," *World Politics,* Vol. V (1953), p. 174.

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the essential concept that membership in a people involves a *wide complementarity of communication.*[4]

In explaining interaction between two areas, Ullman too uses the concept of *complementarity,* but this time with an economic connotation, involving the presence of a demand in one area that the other can supply. To this he adds two other concepts: *intervening opportunity* (borrowed from the sociologist Samuel Stouffer), which can inhibit interaction between the two areas because the demand can be more conveniently met by a third area; and *transferability,* which has to do with the sheer possibility of interaction, as measured in the cost in time and effort to cover the distance between areas.[5] Changes in the technology of transportation can effect changes in all of these processes. The introduction of the internal combustion engine, for example, increased the factor of complementarity between Ontario and Alberta, with the demand for oil and gasoline in the former being met by the supply in the latter. At the time that the Canadian Pacific Railway was being built, however, this element of complementarity was far in the future, and it may be said that every one of the factors mentioned was a stronger argument against including the prairies within the Canadian nation than for it.

At this time the movement of people rather than of goods was the significant process, and here everything was in favor of movement across the Forty-Ninth Parallel rather than along it. Settlers, even Canadian settlers, used the Red River valley to reach the prairies, the latter finding the trip across the barren Shield too arduous. In any case, Canadians were few, and the demand for people could be much more easily filled from the populous eastern states than from the Canadian provinces. Since so many of the settlers were American, complementarity of social communication was stronger across the border than inside it. There is no need to stress the action of

[4] Karl W. Deutsch, *Nationalism and Social Communication,* John Wiley and Sons, New York; The Technology Press of the Massachusetts Institute of Technology, Cambridge, 1953, p. 71.

[5] Edward L. Ullman, "The Role of Transportation and the Bases of Interaction," in *Man's Role in Changing the Face of the Earth,* edited by William L. Thomas, Jr., University of Chicago Press, Chicago, 1956, pp. 862-895.

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intervening opportunity and transferability, since the very closeness of American centers of population, and the barrier within Canada interposed by the Shield, make it obvious.

The fact that the prairies were successfully retained within the Canadian nation suggests that some additional factor must have been at work, one strong enough to overcome the combined action of all the others. To this factor I have given the name *idiosyncrasy,* to indicate that it is peculiar to the given situation. In a private communication, the geographer Arthur Getis has aptly suggested the analogy of *random noise,* a term that is applied to the accidental elements in a system that remain when all explainable elements seem to have been accounted for. That random noise has not been explained does not mean that it is inexplicable. Similarly, idiosyncrasy, although it introduces a contradiction into what seems to be a well-ordered system, may also be explicable. In the present case, the explanation is simple: the Canadian statesmen were determined that Canada would span the continent no matter what the obstacles, and that transportation links would be the agents ensuring nationhood. By insisting that these links would be wholly within the Canadian domain, they went against economic logic, but they demonstrated their topological shrewdness. Once a railroad crossed an international boundary, they understood, it did violence to the *insideness* of their nation, artificial as that insideness might be. Only after the nation had achieved sufficient maturity to allow the factors of Deutsch and Ullman to become operative would it be safe to tamper with the topological purity of its boundary. Nowadays Canadian statesmen are no more worried about Canadian transportation lines taking a shortcut across Maine in traveling from Montreal to St. John, than are Americans about truckers taking a shortcut across Ontario to drive from Buffalo to Detroit. Neither is afraid that its sovereignty is in any way diminished.

LAND POWERS AND SEA POWERS

Imperial powers are sometimes thought of as being either continental or maritime, on the assumption that peoples who have ad-

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ventured readily on land have been uncomfortable when forced to take to the sea, and vice versa. It is as though empires were like bacteria that are obligatory aerobes or anaerobes, the one kind perishing unless they have access to air, the others perishing if they are exposed to it. One thinks of the Incas of Peru, who seem to have been an obligatory land power and never to have ventured on the sea. But empires are not, like microbes, confined within rigid natural bounds, as is evident when we examine two or three examples from the historical record.

Rome and Carthage. One need search for no more apt examples of the strictly continental and the strictly maritime power than were Rome and Carthage in the third century B.C. Rome was already a great land power and had embarked on the program of road building that was for ever after to be the greatest single symbol of imperial order. The most famous road of all, the Appian Way, linked Rome with the heel of Italy. It was begun in 312 B.C., and in 242 B.C. it reached its terminus at Brundisium, which we now know as Brindisi. The two dates are interesting. The former was the last year that Rome could content herself with confining her military activities to solid land. Her empire now embraced the Etruscan seaports north of her and the coastal cities founded by Greek colonists to the south, and these were now her responsibility. They were plagued by pirates, and in 312 B.C. Rome set out to police the waters. The task was beyond the capabilities of the small navy she acquired, and not many years later Rome returned to the land, retaining the ships and sailors of other countries to police the seas for her. The year 242 B.C. is significant for the opposite reason. It marked the end of the First Punic War, which had begun 23 years before. When the war began, Carthage was the paramount naval power in the western Mediterranean; at its end Rome, not Carthage, was the paramount naval power.

The Romans could do what they had to do. To best a sea power they had to go to sea, and they did it. Their military leaders were generals, and when they took to the sea they were generals still. (So it was in England, under the Tudors. Fleet commanders were also

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known as sea generals, rather than as admirals. They too were in process of learning the ways of the sea.)

It is of the greatest importance to understand why Rome beat Carthage in the latter's home element, for what Rome did has been done again and again throughout history. Quigley speaks of the "institutionalization of instruments" [6] and gives numerous apposite examples, many of them directly within the field of transportation and politics, of its disastrous effects on the fortunes of nations and civilizations. Societies, like individuals, get set in their ways, particularly when these have been outstandingly successful in the past, and a newcomer able to make a radical innovation or use unfamiliar tactics can gain a decisive advantage over them.

If the newcomer is a complete novice he does well to begin by profiting from the experience of his opponent, and this is how the Romans began. Just as 22 centuries later the Russians copied an American B-29, the Romans salvaged a Carthaginian galley and built copies of it, though with modifications that made them easier for inexperienced crews to handle. The Roman galleys were heavy and awkward when compared with the sleek Carthaginian originals, but they were supplied with one innovation that, by allowing the Romans to use in a sea battle tactics appropriate to land, gave them the advantage. This was the *corvus,* a spiked plank that could be dropped on an enemy's ship, grappling it tight and allowing Roman legionaries to swarm over. The *corvus* might be called a sea-going Roman road. In the very first battle between Roman and Carthaginian fleets of about equal size, the latter were trounced, losing 44 ships and 10,000 men. In the words of Lionel Casson, "a rank amateur had climbed into the ring with the champion and knocked him out." [7]

Carthage was saved by Roman inexperience at sea. After another battle that left Carthage almost without a navy, the Roman fleet was returning home in triumph when it ran into a storm. The raw sea generals who had been able to outmaneuver their experienced rivals

[6] Quigley, *op. cit.,* p. 50.

[7] Lionel Casson, *The Ancient Mariners,* Macmillan, New York, 1959, p. 163.

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had not yet learned how to ride out a storm, and fully 250 ships, bearing nearly 100,000 men, went down.

More storms and more losses, renewed copying and modifying by the Romans of improved Carthaginian ships, more blockades and battles followed each other, and the Roman oarsmen became even more skilled than the Carthaginian. The last battle of this long naval war was won by them, and the western Mediterranean, which had been for many years the private sea of Carthage, passed under the control of Rome. Carthage had learned that the corridors and barriers offered by transportation media to political overlordship were not immutable; technological change, allied to an opponent's determination, had always to be taken into account.

This truism was again strikingly exemplified in the Second Punic War, which was the exact opposite of the First in everything but outcome. Now the seafaring Carthaginians, having lost their naval supremacy, were forced to dispute supremacy with the Romans on land. And now, for the first time, supremacy on the sea helped the Romans to win a land war. Hannibal of Carthage remains one of the most renowned figures of antiquity because he overcame the barrier of the snow-blocked Alpine passes to invade Italy from the landward side. (Where, the British scientific writer Ritchie Calder astutely wonders, did Hannibal get those elephants? Bringing them along was a brilliant stroke, for they added to the impressiveness of the Alpine crossing and badly frightened the Italians—but where did they come from? There are no elephants on the desiccated coast of North Africa today, and they certainly could not be marched from their present haunts in Asia and Africa across the intervening deserts. The ancient geographer Strabo may supply the answer. Though his bestiary is not always reliable, it may be possible to believe him when he says that North Africa had elephants in his day.)

Hannibal was forced to perform this glamorous feat because the easier way of taking his army from Spain to Italy, via sea-going transports, was blocked to him. Though he was able to ravage the Italian peninsula, the loss of the sea in the end defeated him, for he was unable to reinforce or feed his army, while Rome continued to

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be well supplied by her fleet of grain ships. Carthage was not razed and salted down by the Romans until more than half a century after the Second Punic War ended, but she had lost all her power as a result of the first two wars.

Control by one nation of the whole Mediterranean came, for the first and almost the only time in history, with the victory of Augustus over Antony and Cleopatra in the naval battle of Actium (31 B.C.). Though Romans won this battle, Romans also lost it. Listen to these words of an old Roman soldier, as reported by the English cosmographer Peter Heylin three hundred years ago. The introductory remarks are Heylin's:

> *Antony* was on the offensive-side, and therefore much doubted whether it were better to give the Onset by Sea or by Land. *Cleopatra,* whose words were Oracles, persuaded him to the Sea-fight; not that she thought it more safe, but that, if *Antony* lost the day, she might with more facility escape. To this resolution, when most of the Captains had for fear agreed; one of the old souldiers thus bluntly gainsaid it. "What a miserable security art thou possessed with, most noble Emperor? Where is that ancient foresight wherewith thou hast formerly prevented all disasters, & turned the Enemies devices on their own heads? Consider with thy self, most noble General, what uncertain friends the Wind and Sea are? To how fickle an Element thou dost trust the fortunes? Let the *Egyptians* and *Phoenitians,* old *Mermaids,* born and nurst up in the Sea, follow this kind of warfar. But let us thy true *Roman* spirits try our valour on the firm Land, and there fight for thy Empire, and our own Lives. . . .[8]

Could there be a more splendid statement of the psychology underlying exploits on land and sea? "Let the *Egyptians* and *Phoenitians,* old *Mermaids,* born and nurst up in the Sea, follow this kind of warfar." Why they, and not the Romans? Why did the citizens of Phocaea people the western Mediterranean, 1,500 miles away, and the citizens of nearby Miletus practically turn the Black Sea into a Milesian lake, whereas other Ionians stayed close to home? Athens

[8] Peter Heylin, *Cosmography,* 6th edition, London, 1682 (first edition, 1664), Book 1, p. 41.

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became a sea power, but so did the Peloponnesian city of Corinth, whereas Sparta, the leader of the Peloponnesians, did not. The corridors and barriers were the same for all, but the response was different. Here is evidence of the danger of arriving at too-sweeping conclusions from the examination of elements selected out of a total pattern, a danger that is ever present in a geographic study of transportation and politics. We may always conjecture, but we can rarely conclude.

In any case, after the battle of Actium Augustus was the sole ruler of the Roman world. He inaugurated the greatest period of the Roman Empire, and for the next 250 years Rome was supreme *on* the Mediterranean as well as around it. When her decline began, it was heralded by disasters both on land and on sea. One of the former kind was the defeat of a Roman army by the Goths at Adrianople (378 A.D.), where for the first time the foot soldier had to contend with heavy cavalry. Thereafter the Romans too adopted the new (to them) type of warfare, their *cataphractories* mounted on armored horses foreshadowing the medieval knight. The Eastern Roman Empire was so worried by the threat from the sea that it forbade its shipwrights to teach their skills to the barbarians, on pain of death.

It has long been popular to draw resemblances between the Romans and the Americans. It is all too easy to do so here—the feverish application of techniques developed elsewhere in the world and the search for new ones, the fruitless attempts to deny technical knowledge to a potential army, the constant attrition of power at the extreme bounds of the area of influence. Though the Roman failure need not induce paralysis of the will, it would be well to learn from it.

China as a Sea Power. Resemblances have also been drawn between the Romans and the Chinese. The latter have been thought to be fully as land-oriented as the former, and their land empire was in its own terms just as vast. And yet there was a time when China too was a power at sea. This period may have been given less weight than it deserves because, when viewed in the long procession of re-

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corded Chinese history, it is so short. Seen in any other context, it is long enough, for it extended over three hundred years, or for as long a time as Britain herself ruled the waves.

It cannot be denied, though, that the emphasis given to China as a land power is justified. In the years when Rome was first becoming a power at sea, for example, the Chinese were passing through one of their most successful periods of expansion on land. The climax came in 104-100 B.C., when the Emperor Wu Ti was able to subdue Ferghana, beyond the Pamirs. Over more than 3,000 miles of desert and mountain marched an army of 60,000 men, 100,000 oxen, more than 30,000 horses, uncounted numbers of donkeys, mules and camels, and a supply train—one of the most fantastic logistic achievements in all history. This was the time of the first contact between China and Rome and the beginning of their trade in silk. The famous Silk Road for a time traversed just two empires, the Chinese and the Roman, over most of its way, the only interruption occurring in the area east of the Caspian Sea, which was held by the Parthians. (The Silk Road has been the subject of geopolitical theorizing that is of some interest. The chain of oases that it followed has been likened to a geological fault line, with disparate social units on either side—the nomadic Huns and Mongols to the north, the more sedentary Tibetans to the south. This fault line was therefore a natural communication route both in physiographic and in political terms.)

The landward orientation of the Chinese through most of their history has not deprived them of all experience on the water, for the Chinese have at all times been prodigious rivermen and canalmen. Inland waterways have directed the economic and social life of the country, as can be seen in the remarkable scroll painting, *Spring Festival on the River,* which gives an unparalleled pictorial record of life in China six or seven hundred years ago.[9] The scene swarms with people, it is full of vivacious movement, and always there is the

[9] Metropolitan Museum of Art, New York, *Ch'ing Ming Shang Ho* (*Spring Festival on the River*), a scroll painting of the Ming Dynasty after a Sung Dynasty subject, with introduction and notes by Alan Priest, New York, 1948.

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river, with a road beside it. The river is the unifying thread passing through a panorama of diversity.

Rivers have been just as important in the military and political life of China, and Chinese history, from the earliest times to the most recent, abounds in river battles. One such battle, that of the Talas River in 751, has been included among the most decisive battles in world history, comparable to the thirteenth-century Battle of Pelagonia, which resulted in the irrevocable separation of Greek and Roman Catholicism—for a Chinese defeat led to the loss of Sinkiang and the rise of Islam in a region that had previously been strongly Buddhist. The cataclysmic Taiping Rebellion that devastated much of China in the middle of the last century began with changes in the pattern of dominance among rivers of southeastern China. The shift of the tea trade from Canton to Shanghai in the 1840's caused a dislocation in the economy of southeastern China and in turn affected opium transport. Canton was the port of entry of this drug, and from there the drug had been moved to inland China along north-flowing rivers. Now the movement shifted to other rivers that flowed to the northwest, and the bandits who protected the opium traffic moved with it into Kwangsi, increasing tensions in an already tense area. The battles between rival groups of bandits, and between bandits and river pirates, and their subsequent co-operation among themselves, laid the groundwork for the Rebellion of the 1850's. More recently, the famous Long March performed by the Chinese Communists escaping from the victorious Nationalists in the 1920's, was punctuated by huge battles that took place every time a river had to be crossed. Finally, the long war between China and Japan was essentially a war of rivers.

As for the Chinese canal system, it is of the same order of magnitude as the most extensive rail network in the world, that of the United States—some 200,000 miles for the former, 220,000 for the latter (but only about half the mileage of China's canals is navigable). Much of this mileage was constructed in the first half of the twelfth century by the southern Sungs, partly as defense against the Mongol invaders, who had driven them out of the north. Not only

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did the canals serve as media for the military transport of the Chinese, but they were also effective barriers against the military transport of the Mongols, their cavalry. Canals and rivers have at all times had this dual role, serving as corridors to water transport along their length and barriers to land transport across it.

[The defensive strength of canals is attested by the experience of Venice. As long as her domain was bounded by canals, she was safe from invasion and could be defeated only by blockade. Like Athens at the end of the Peloponnesian War, however, she could be starved into submission because her food had to be imported over the sea. Once Venice began to expand onto the mainland, she learned of the vulnerability of land frontiers.]

As so often occurs in history, the debate between proponents of continental and maritime policies—that is, between those who wished to use land transport in battle and those who preferred to move by sea—broke out among the Sungs. It was this debate that led directly to the rise of China as a sea power. Should the Sungs counterattack, and try to drive the usurping Mongols out of the northern part of their country? To do so they would need cavalry, in which the Mongols were strong and they themselves were weak. Or would it be better for them to content themselves with retaining South China, by making the Yangtze River and the South China Sea their ramparts, and defending themselves with naval forces? They chose the latter course.

In 1131 a Sung official called the sea and the Yangtze the new Great Wall of China, the warships being the watch towers.[10] Such language is remarkable coming from a continental power; it is what one would expect from islanders. Just three centuries later, precisely at the time when the Chinese maritime phase ended, an English bishop urged his countrymen to "kepe then the sea that is the wall of England, and then is England in Goddes hand."

[10] Jung-pang Lo, "The Emergence of China as a Sea Power During the Late Sung and Early Yüan Periods," *Far Eastern Quarterly* (now *Journal of Asian Studies*), Vol. 14 (1955), p. 502. The paper as a whole (pp. 489-503) has been the most valuable source for the present discussion of China as a sea power.

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Under the southern Sung, the Chinese developed what Jung-pang Lo calls the first national sea-going navy, set up as a permanent organization and administered by a special organ of government. What the Sung had started, the Mongols continued. We know, from the stories of Marco Polo and other travelers, how remarkable the empire of Kublai Khan was, how receptive to new ideas. Even so, it comes as a surprise that the Mongols, horsemen from the desert with no knowledge of the sea, should have taken so enthusiastically to the water, and that they should have become so adept a naval power in so short a time. It took just twenty years for the Mongols to advance from the use of inflated skins and rafts to cross rivers, to the use of seagoing ships for conducting large-scale naval wars against the Sung, against Japan, and against Formosa, Tongking, and Java.[11] Like the Romans, they copied from their enemies and improved on them. The feat of the Mongols, however, is even more impressive than that of the Romans. Perhaps the most remarkable thing about the Romans is that the sea should have been strange to them, surrounded as they were by it, though this does not in any way diminish their accomplishment. For the Mongols, the sea was a completely unknown element; the mountains that pinned the coastal Chinese to the sea kept the inland peoples from all contact with it. Perhaps an excessive awe at the speed and thoroughness with which the Mongols transformed themselves from a desert to a sea power betrays an environmentalist bias. If so, the experience is a good corrective. One cannot long contemplate this transformation and continue to believe in environmental control.

When the Ming dynasty began, with the overthrow of the Mongols in 1368, Chinese navalism did not come to an immediate stop. Indeed, it reached its peak with the third Ming Emperor, Yung Lo, in the first decade of the fifteenth century. Yung Lo sent powerfully armed expeditions into all the seas touching on Asia to the east and south, even taking control of the Indian Ocean away from the shore-hugging Arabs. One such expedition is said to have consisted of 62 ships carrying 30,000 soldiers. If this report is true, the expedition

[11] *Ibid.*, p. 492.

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must have been one of the great amphibious operations in history, comparable with those carried out in the Pacific during World War II, and far beyond anything the West could attempt until centuries later.

China's Decline at Sea. Why, then, did the Chinese ultimately turn away from the sea? Jung-pang Lo believes that there are two causes, one physical, the other psychological. The first was the renewal of interest in the land movement into the north and west, in which the old routes through the Kansu Corridor played a part. At the same time the Ming government tried to close the seaports against raiders from Japan and adventurers who were beginning to reach them from Europe. The second was a reversion to the complacency and exclusiveness that were so conspicuously lacking during the Mongol period. Whereas earlier there were technological innovations comparable to the best that Europe could show in succeeding centuries, now the Chinese forgot even the arts they had learned.

This interlude in Chinese history gives cause for reflection. Because the oceans of the world were opened by European adventurers, and not by the Chinese or other Asians, modern scholars in the West have assumed that there existed in Europe a maritime dynamism attributable to the conformation of the European continent, to its navigable and even-flowing rivers, to its invigorating climate, to the stimulus provided by its continuously evolving social, economic, and religious institutions, to the mutual challenge presented by competitive, aggressive spirits, and to many other things. The maritime passivity of the Asians, which caused them to allow themselves to be acted upon instead of acting, was attributed to the conformation of *their* continent, and so on and so on, with a preponderant role being given to their static land-tenure system. Undoubtedly much of this is valid. Much else, on the other hand, becomes less persuasive when we take into account the three centuries, *before* the flowering of European navalism, during which China was a substantial sea power, with a thoroughgoing navalism of her own.

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THE AGE OF DISCOVERY

The first European to reach China by sea was a Portuguese; the year was 1514. His arrival was the culmination of nearly a century of effort, which began with the explorations of the western coast of Africa that were stimulated by Prince Henry the Navigator.

Of the five reasons for Henry's policy listed by his chronicler, Gomes Eannes de Azurara, the first was scientific, the second commercial, the third strategic, the fourth political, and the last religious. The list seems exhaustive. Has a single class of reasons underlying epochal events been missed?

All of Henry's reasons except the first were thoroughly intertwined. The first, a scientific curiosity about the unknown, stands by itself because it was unusual for the time. The others, however, were in complete harmony with the time, which saw the last of the Crusades. Henry's navigations were, in fact, the extension of the crusading spirit by other means. The actual Crusades had failed. Instead of the Christian West conquering the Mohammedan East, the opposite occurred. The Ottoman Turks became established upon the Danube, and, in 1453, less than a decade after the last Crusade was defeated at Varna (on the Black Sea south of the Danube), revolutionized the political and transportation patterns of the whole world (as it was then known) by taking Constantinople. Europeans were confined to Europe, their single external possession being Ceuta, on the African coast opposite Gibraltar, which Henry himself had captured as a youth of twenty-one in 1415.

Now Henry wished to learn if Christianity and Christian commerce might not still prevail. Perhaps there were Christians in Africa or Asia beyond the lands of the Moslem, as the powerful legend of Prester John (Presbyter Khan—the Priest King) suggested. If so, the Moslems might be outflanked by sea, the furthest extent of their power discovered, and a commercial and political alliance entered into with the Christians beyond. Finally, there was the proselytizing spirit, the desire to save souls by converting the heathen to Christianity.

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Geographic discovery now had its stimulus, but for the attempts to be successful the technology of transportation had to be adequate. The Portuguese learned the arts of navigation and gained geographical insights from the most expert seamen of their day, the Genoese and Venetians. Among their most useful acquisitions were the *portolani,* mariners' charts giving details about harbors, winds, and currents, which were the first scientific maps that could be put to practical use. But it was their own experience with the winds off Africa that led them to develop the caravel into the most seaworthy vessel of its time. The prevailing north winds made sailing down the coast of Africa easy, but the return journey fearfully difficult. This was one of the reasons, along with the reputed falling of the waters over the edge of the earth beyond Cape Bojador, and the inhospitality of the desert shores, that men feared to make the voyage down the African coast. The chief virtue of the little caravel was that it could be easily sailed against the wind. With it one of the greatest barriers to oceanic travel was removed, and the discovery of the sea route to India, Malaya, and China, and the voyages of Columbus to America, followed.

The way shown by Portugal and Spain was followed by the other countries of Western Europe, and during the seventeenth and eighteenth centuries they acquired colonies in the New World and Asia. Note that it was only Western Europe that participated, not the whole of Europe. The eastern parts were little affected by the exciting discoveries across the open sea. The Russians were experiencing excitements of their own—the lure of the enormous expanses of land stretching away to the east of them, to which they gladly succumbed.

It is an unfortunate accident in the history of the only Slavic nation to gain maritime pre-eminence before the modern era, Poland, that just at this critical time she turned from a maritime to a land-based policy. Poland's maritime tradition goes back fully a thousand years, as far back as England's. But whereas England's has been virtually continuous ever since 900 A.D., that of Poland has been interrupted. The leading Baltic power in the Middle Ages, Poland turned

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to a policy of aggrandizing herself on land, just at the time when the Western European nations were discovering the riches beyond the seas. The land struggles of the eighteenth century resulted in the obliteration of the name of Poland from the map, and only after the Treaty of Versailles of 1919 was there again a Poland that could debate with itself whether to follow a maritime or a continental policy.

Land and Sea Routes after the Age of Discovery. The age of discovery led to an entirely new relation between transportation by land and transportation by sea, and political relations too became transformed. In the sixteenth century the contest between land routes and sea routes, and between country and country, for the first time began to take place on a global scale. The peaceful passage of caravans across Central Asia had already been disrupted in the previous century, with the fall of the Mongols and the ending of the "Pax Tatarica," and the Portuguese effectively blocked the competing water routes through the Red Sea. Mercantile states such as Genoa and Venice, which had become great through the exploitation of these routes, now suddenly plummeted, politically as well as economically. It has often been maintained that the capture of Constantinople and the Dardanelles by the Turks in 1453, and the revolutionary effect this had upon Eurasian transportation patterns, brought these disasters to the Italian states. But Genoa and Venice continued to prosper for another half-century, until the Portuguese found the way around Africa, and it was only then that they suddenly declined.

Similar legends have flourished about other apparently decisive events. The decline of the Spanish colonial empire and the rise of the British, for example, are often dated from the defeat of the Spanish Armada in 1588, when in fact the defeat "was not so much the end as the beginning of the Spanish navy," and "more American treasure reached Spain in the years between 1588 and 1603 than in any other fifteen years in Spanish history." [12]

It is natural to expect dramatic occurrences to have equally dra-

[12] Garrett Mattingly, *The Armada,* Houghton Mifflin, Boston, 1959, pp. 397-398.

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matic consequences, and, perhaps, equally dramatic antecedents. The Armada wil again serve to show that antecedents need be no more dramatic than consequences. It is pleasant to read about Sir Francis Drake's continuing to bowl nonchalantly when the Armada was practically in sight. Less romantic, but more to the point, is the story of Drake and the barrel staves. In 1587 Drake raided Cape St. Vincent and burned Spanish ships laden with barrel staves made of properly matured wood. In outfitting the Armada the Spanish were forced to use green wood; their barrels leaked, and even before the Armada reached the English Channel, food and water began to go bad. According to Mattingly, this was as big a factor as any other in the subsequent defeat of the Armada.[13] In spite of what was said above, this defeat was *ultimately* a climactic event in history, particularly because of what it did to the psychology of nations, but it had its unspectacular antecedents. In the story of transportation and politics, as in most others, it is the unspectacular that is frequently most deserving of notice.

The defeat of the Armada may not have assured England's immediate supremacy on the seven seas, but in time she, more than any other nation, learned to take advantage of the opening of these seas that the Portuguese pioneered. She became the greatest of all maritime powers.

Her island position off the western edge of the Eurasian continent did not exempt England from participation in debate between a maritime and a continental policy. She did not have long overland routes to defend, for her lifelines were sea lanes, but she did not always find it possible to defend these lifelines on the sea alone. At times she had to make up her mind whether it were the better policy to concentrate on a direct defense of these lifelines through naval effort, or to strike at the enemy's strength on land.

Two related themes have run through most of England's diplomatic and military history. To the northeast, she had to have secure access to the Baltic Sea, for she was dependent upon the countries that bordered it for the cordage and masts of her navy. To the east

[13] *Ibid.*, pp. 120-128.

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and south, she had at all costs to retain control of the Narrow Seas that separated her from the continent. Both objectives could be partly met by a maritime policy. If Britain remained sufficiently strong at sea, she could keep the way open to the Baltic, which supplied ingredients essential to that strength, and make of the Narrow Seas a moat against invasion. But this policy had to be reinforced by a continental one. Control of the Narrow Seas had to be reinforced by the assurance that the mouth of the Scheldt, opposite the Thames, and its great port of Antwerp, did not long remain in the hands of a powerful adversary, and England had to be ready to fight such an adversary on land if need be. Similarly, it has always been part of British policy to keep the mouths of the Rhine and Meuse (Maas) out of the hands of powers that might threaten her, and this policy too has led her into frequent wars on land.

When England went further afield, the maritime policy predominated. On occasion it still had to be supplemented by continental action, as in the North African battles of World War II, whose chief object was control of the Suez Canal, for if the Germans could gain it their way was open to the Middle East and India. Usually, however, England's interest in distant lands, as far as defense of transportation routes was concerned, restricted itself to a sagacious concern for bases. Examination of British policy with respect to bases involves us in the study of colonialism, which is the subject of the following chapter.

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4 *Colonialism*

TRANSPORTATION is related to colonialism in two ways. First, technological advances in transportation have made possible the acquisition of colonies for political aggrandizement or for economic purposes, and their later exploitation and retention within the empire. Second, the needs of transportation itself have led to the acquisition of other colonies to serve as staging points or defensive posts along extended routes—the lifelines of empire.

Though colonies may be acquired either with the aid of transportation or for it, the categories are not pure. Colonies that are established for some other purpose may also serve as jumping-off bases for further colonization, or as defensive bases for the protection of transportation routes. On the other hand, colonies whose chief purpose is to serve as defensive bases may be found to be valuable for other reasons besides.

A glance at the ancient world will help to illustrate these distinctions. Many of the 250 colonies with which the Greek city states dotted the shores of the Mediterranean and the Black Sea were intended to add to the commercial wealth of the mother cities. If they were to serve their purpose, the transportation routes linking colonies and mother cities had to be safeguarded, and this was best done from defensive bases strung along these routes. Many other colonies owed their existence chiefly to population pressure. The hinterlands of Corinth, Phocaea, Miletus, and other colonizing cities were able to support only so much population, and, to relieve the pressure, these cities sent their sons and daughters out to found new colonies in unoccupied or insufficiently defended places. In such cases the safeguarding of transportation routes did not enter, for the mother

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cities were not to any great extent dependent upon these colonies, and links could be broken without damage other than to pride. Colonies warred as easily against their mother cities as against any others. One of the underlying causes of the Peloponnesian War, for example, was a family quarrel between Epidamnus, Corcyra (Corfu), and Corinth—daughter, mother, and grandmother—in which Athens allowed herself to become involved. One of the arguments that Corcyra used in her successful bid to bring Athens in on her side is of direct relevance here. "Apart from all other advantages," said her ambassadors, "Corcyra lies in an excellent position on the coastal route to Italy and Sicily, and is thus able to prevent naval reinforcements coming to the Peloponnese from there, or going from the Peloponnese to those countries." [1]

DEFENSIVE BASES

When the mother country was dependent upon her colonies, either for the necessities of life or for its luxuries, contact had to be preserved at all costs. An enemy occupying a position athwart a line of contact was incomparably more dangerous than a much stronger one elsewhere. By the same token, any spot that would serve as a defensive base became precious. Oases of water in a desert of land, oases of land in a desert of water, have therefore been prizes for which empires have contended.

The success of the Russian Empire and its legatee, the Soviet Union, has been founded upon the policy of extending transportation lines, through the deserts of Central Asia and beyond, that connected nuclei of settlement. The Cossack stations that the Russians established all along the postal highway to Lake Baikal and the Mongolian frontier effectively made Siberia part of the Russian Empire even before settlement began, and long before Russia's hold was consolidated by the Trans-Siberian Railway. Indeed, it was only after the railway was in existence that the peasants began to pour in at the rate of 500,000 to 1,000,000 persons a year. Before then, the

[1] Thucydides, *History of the Peloponnesian War,* translated by Rex Warner, Penguin, London, 1954, p. 33.

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Cossack stations acted as true defensive bases, guarding the borders and the transportation route that followed them.

The success of the British Empire had a similar cause, though this time the transportation lines were across water, and the defensive bases on bits of strategically placed land.

Malta. British dependence on island bases was well illustrated in World War II, with the island of Malta providing a particularly instructive example. The importance of Malta to Britain was recognized even before it became a British possession. Nelson blockaded it, and ultimately wrested it from the French, because he considered Malta to be "a most important outwork of India." And as an outwork of India it performed the heroic task for which the whole island received the George Cross, Britain's highest civilian award for heroism, in 1942. Its splendid harbor of Valetta was an indispensable mid-Mediterranean base for the British fleet, and its airfields gave the Royal Air Force an unsinkable aircraft carrier. Through its use the British were able to send supplies and reinforcements to their troops in North Africa, and to deny supplies and reinforcements to the Axis forces. So effective was the island that the Axis powers mounted one of their most concentrated efforts of the war to knock it out, and almost succeeded. In August, 1942, Malta had only three weeks' supply of food left. Even more important for the war effort, it was almost out of oil, and without oil for ships and planes it was useless, and there would no longer have been any point in trying to hold on to it. Luckily, a few of the ships in the huge convoy of "Operation Pedestal" managed to reach it, and among them was the oil tanker *Ohio.*

It has been contended that the outcome of the whole war against the Axis powers turned upon this single event—the safe arrival of the *Ohio.* This seems to be an exaggeration. The same contention has been made, for example, about Hitler's decision to come to Italy's aid against Yugoslavia, with the resulting delay in his attack on Russia that brought his unprepared troops and planes and tanks into catastrophic collision with the Russian winter. There are many other events that in retrospect have been accorded the status of turn-

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ing-points. Besides, the bases on the islands of Iceland and Newfoundland, and at Dakar, played a part in the war at least as important as that of Malta, if less dramatic. Especially after Norway fell, control of the Atlantic might have fallen to Hitler's submarines, and with it the bastion of Britain, had it not been for these bases. They made possible the introduction in 1941 of the continuous escort of convoys by warships and planes that proved to be the only effective way of coping with the submarine menace. (According to Captain S. W. Roskill, the escorted convoy has always been the best defense against the *guerre de course*—attacks against merchant shipping—but admirals have had to learn this lesson afresh with every war.[2]) Yet Winston Churchill's comment that the defense of Malta "formed the keystone of the prolonged struggle for the maintenance of our position in Egypt and the Middle East" tells us how very important Malta was. By extension this statement means that the fate of India was as closely tied to that of Malta in the present century as it was in Nelson's time.

That Suez and India—and who knows, perhaps the world itself—may have been saved by the arrival of a single cargo of oil seems inconceivable, but it may be true.

Lack of Bases. If the possession of overseas bases was of critical importance to the Allies, their lack was of equal importance to the Germans. Having been deprived of her colonies after World War I, Germany had no overseas supply bases. She was therefore forced to try to refuel her U-boats at sea, or to find remote neutral harbors where they could be refueled in secret. In either case the U-boats were vulnerable to enemy action, and many were tracked down and destroyed while being refueled.

A similar lack of overseas bases had fatal consequences for Russia at the beginning of the century. The annihilation of Admiral Rozhdestvensky's fleet by Admiral Togo in the Battle of Tsu-Shima was at least in part attributable to this circumstance. A gigantic fleet of ill-assorted and ill-manned vessels had to travel 18,000 miles

[2] Captain S. W. Roskill, R. N., *The Strategy of Sea Power,* Collins, London, 1962, p. 41.

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to its rendezvous with the Japanese, without a single assured coaling station or outfitting port en route. Ships and men went into battle in a bedraggled condition, and defeat was practically assured before the battle began. Rozhdestvensky's difficulties were aggravated by the total absence of a Russian merchant navy, which forced him to rely for his coal supplies on foreign colliers. The moribund condition of the merchant navy reflected the dominance of the continental over the maritime forces in imperial Russia. Not shipping, but railways, were to help the empire expand into Central Asia and Mongolia, in the manner that we have mentioned previously.[3]

The lack of overseas bases need not, however, be fatal. In the Pacific War the United States had to cover vast distances of open water, and Japanese successes had deprived her of nearly all developed island bases. To sustain her fleets she devised a highly successful floating supply organization known as a "Fleet Train." Here mobility itself was used as a means of defense, as it has been many times in the past and is being used at this very moment. The containment policy upon which the United States placed her chief reliance until recently was merely a continuation of the policy of seeking advantageously placed overseas bases. This policy had to contend with grave political difficulties, not least of which was the neutralist spirit rising in many of the countries where bases of the Strategic Air Command (which itself was an extension of the principle of defense through mobility) were located. The development of the first true submarine has given the United States a much surer means of defense. Land-based missiles on stationary launching sites are vulnerable to attack, but missiles in nuclear submarines that are ceaselessly cruising in random patterns in all the oceans of the world,

[3] Today, although railways still dominate Russian transport, shipping is being increasingly used, especially in the Far East. John D. Harbron has remarked on the mysterious disappearance from the world's sea lanes of the once-familiar passenger liners that Russia took over from Germany after the last war. They are being used to carry settlers from Vladivostok to the new ports on the Pacific Coast of Soviet Asia. (*Communist Ships and Shipping*, Adlard Coles, London, 1962, pp. 145-146.)

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remaining submerged and in motion for months at a time, are completely undetectable and therefore invulnerable. But notice that this defense through mobility is not for the protection of transportation routes, nor does it directly protect anything else. It is helpless against an enemy determined to begin a nuclear war; its sole function is to sap his determination to do so, by assuring him of the most frightful consequences to himself should he give way to it.

A too-strict preoccupation with bases by a nation's naval forces can be harmful to that nation's prospects, as Mahan has demonstrated again and again in the most famous book about sea power ever written.[4] While it is true that "Colonies attached to the mother-country afford . . . the surest means of supporting abroad the sea power of a country," a nation that concentrates its naval attacks upon the bases of the enemy is courting failure, for "military wisdom and economy, both of time and money, dictate bringing matters to an issue as soon as possible upon the broad sea, with the certainty that the power which achieves military preponderance there will win in the end." The keynote of Mahan's doctrine is struck by the statement: "The sphere of the fleet is the open sea . . . its objective the enemy's shipping wherever it can be found." In terms of transportation and politics, Mahan's thesis was that a maritime nation would establish political pre-eminence if it was able to transport its military might anywhere upon the seas, and the chief function of this seaborne might was to destroy an enemy nation's ability to do so.

It is nearly three quarters of a century since Mahan wrote. His words have had a tremendous impact upon the history of the first half of the present century, particularly since his book became the Bible of the German navy. Do his words retain validity in the age of the missile? It is not for us to offer comment; perhaps all the comment that is needed is provided by Russia, with her hundreds of

[4] A. T. Mahan, *The Influence of Sea Power Upon History,* Hill and Wang, New York, 1957 (original edition, 1890). The quoted passages will be found on pages 72, 369, and 404.

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submarines, and by the United States, which has spent nearly half a billion dollars to build a single nuclear-powered aircraft carrier.[5]

ECONOMICALLY VALUABLE COLONIES

Whereas defensive bases are a means to an end, economically valuable colonies are an end in themselves. As such, they do not serve transportation, but are served by it. They are acquired in the first place through the exploitation of new technological refinements in transportation, and thereafter the position of the colonizing country is consolidated by means of transportation improvements in the colonized country.

The progression is logical. One of the distinctions between colonizer and colonized is that the former has much more sophisticated means of moving about than the latter. The colonizing country is stronger, but strength by itself is not enough. Just as today the possession of a nuclear bomb by a country is of little significance unless that country also possesses the means to deliver it (hence the emphasis placed on the missile), so at all times the ability to exert military power at a distance has been the touchstone for colonial success.

It is important to emphasize that poverty in transportation facilities is symptomatic of other weaknesses. It may denote a sparsity of population and a low level of civilization, as in primitive North America and Australia. It may denote a period of decay and disintegration, as in China under the later Manchus. It may denote an extreme environmental adversity, as in parts of Southeast Asia, South America, and Africa. It may denote a fundamental disunity, regional and social, as in India. In every case there has been weakness to be exploited, and this weakness has found expression—and has been exaggerated—by inadequacy in transportation.

Only one outstanding exception to this proposition comes to mind, and that is the condition of Inca Peru when it was subjugated by

[5] Let us pause a moment on this figure. The *Enterprise* cost $444 million. The gigantic navigational works of the St. Lawrence Seaway, whose alleged costliness has been one of the pretexts for so much controversy, came to $458 million.

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the conquistadors. Peru then had one of the most remarkable road systems ever constructed, comparable (before our day) only to that of Rome, and in some respects superior even to it. But even this exception may serve to confirm the proposition, for the Inca roads had a special character: they were intended primarily for conquest. They were, indeed, the sophisticated means of transportation used to carve out an Andean empire, but they were relatively little used for economic purposes. The roads reflected military strength that was greater than that of neighboring states, but not a comparable economic strength. They were brought to the extreme of perfection that a limited technology would allow. But the Incas had no wheel, nor draught animal, and were almost completely unfamiliar with the sea, from which they were separated by the desert coasts of western South America. When they met an enemy from what was to them another world, with a superior technology of transportation, an enemy who could take better advantage of their superb roads than they themselves could, they were lost.

Once a country has been colonized, the inadequacy of its transportation facilities becomes a weakness to the colonizer. The problem is exactly the same as that confronting an independent state, which to remain viable must have an administrative center from which the farthest reaches of the domain may be controlled. In order to be able to reap economic benefit from the colony, and to keep all parts of it under his control, the colonizer must improve the facilities whose very inadequacy helped make his incursion possible.

COLONIALISM AND RAILWAY BUILDING

The modern era of greatest colonial expansion coincided in time with the era of greatest railway construction. The coincidence is by no means accidental, for modern colonialism on a continental scale needed the railway. The end result of the construction of railways, and of the making of other improvements to transportation and communication in colonial countries, was, however, unexpected. The improvements that in the beginning helped colonialism, in the end produced the conditions that are now destroying it.

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The largest theaters of colonial activity in the nineteenth century were India, China, and tropical Africa. Of these, only the last shows colonialism in its pure form. India had too far advanced a civilization, too many people, too much diversity, to be properly called a colony. As for China, no large part of it was formally detached from the central government during the nineteenth century, as Manchuria was during the twentieth, to become the Japanese colony of Manchukuo. Thus imperial penetration during the nineteenth century of India, China, and tropical Africa was in each case different. But in each case there were these similarities:

1. The foci of invasion had originally been coastal points at which administrative centers were established, and from which railways were later built into the interior, so that as large areas as possible might be brought under the economic, political and military control of these centers.

2. In no case did the foreign builders intend the railways to serve the interests of the people through whose territory they passed.

In China the land frontiers with the Russian empire in the north and the French empire in the south introduced exceptions to the pattern, as did the participation of the nominally independent Chinese government in railway building.

With insignificant exceptions, all parts of India were in the control of a single imperial power, which meant that the railways had the function, not of carving out empire, but of consolidating it. In China, only the ports where extraterritorial rights had been granted were ostensibly under the control of the imperial powers, of which there were half a dozen. The attempt by each power to appropriate for its ports the largest and most profitable hinterlands led to the "War of the Concessions" of the 1890's, in the course of which the rail network whose deficiencies were to plague China until the present day was begun. The experience of tropical Africa was an amalgam of those of India and China: almost all its territory was in the hands of aliens, as in India; and there were half a dozen contending powers, as in China. In India, the economic motive for railway construction was dominant, though the desire to facilitate troop

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movement was also present. In the more complex situation of China, economic and political considerations reinforced each other. In Africa, where rivalries between the colonizing powers were intense, and there was no centralized local government to play the rivals off against each other, political considerations dominated all others.

India. The railway network of India is remarkable both for its extent and for the little good it did the country. With over 40,000 miles of first-line main track before partition, India was barely nosed out by Canada for third place among the countries of the world in railway mileage. (The United States tops all other countries, with a mileage that is now approximately 220,000. In second place is the Soviet Union, with close to 80,000 miles.) But, whereas elsewhere the railway was the key element in bringing industrialization to a country and helping it reach a stage of economic advancement, in India it had no such effect.

The reason is to be found in the manner in which the railways were constructed, and their purpose. Construction began under private British enterprise, with the government guaranteeing the "risk-takers" a 5 per cent annual interest on their investment. In consequence there was no risk, and no care was taken to choose the most economic locations nor the most efficient methods of construction, nor were efforts made to produce the greatest possible revenue. The similarity with Germany's most notorious attempt to use the railway for imperial purposes is striking. When she gained the concession to build the Turkish section of her famous (though never completed) Berlin-to-Baghdad Railway, which was to be the continental answer to British maritime control of Gibraltar and the Suez Canal, she was guaranteed a fixed payment per kilometer of road constructed and given rights to all the mineral, forest, and water resources within 12½ miles of the right-of-way. Consequently the railway is much longer than it needs to be, to the discomfiture of modern Turkey. (See Figure 1, p. 12.)

Since the Indian railways were in British hands, built by British money, with Britons monopolizing the highest positions, the Indian people did not gain the advantages from it that they would have if

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money and men had come from them. It has been contended that in the first 75 years of their existence the railways, by disrupting traditional economic patterns without substituting adequate new ones, destroyed more jobs in India than they created.

Even after the railways became nationalized in 1924, as a result of the hostility to foreign ownership expressed in Ghandi's first civil disobedience campaign, the country fared little better. The railways were intended to bring the raw materials from the interior of India to the great ports, whence they were sent to the factories of the United Kingdom, and finished products were shipped in the opposite direction on the same routes. In thus fostering British industry, the railways continued to stifle that of India. Railways were on three different gauges; the largest (5 feet, 6 inches, as against the American and European gauge of 4 feet, 8½ inches) was insisted upon by the military authorities, in spite of the extra costs it imposed on the economy. Differences in gauge imposed restrictions on movement between north and south, thereby hindering economic co-operation and political unity. Finally, as a government monopoly no less than as powerful private companies, railways offered such strong competition to highways that India has been left with an excessively poor highway system.

Neither under private ownership nor under public ownership did the railways bring economic benefit to India on the scale that they should have, though unquestionably much of India's social life in time revolved around them; the teeming railway stations provide the visitor to India with some of his most vivid impressions of the country. The greatest single good that has been claimed for the railways is that they did help to alleviate the ravages of famine, by making it possible to move food supplies rapidly between areas of surplus and areas of deficiency. But even here the bad at least balances the good, for the railways also made possible the export of foodstuffs out of India, and when bad crop years came, as they did in the 1870's and 1890's, reserves were not adequate to prevent the most devastating of famines.

What the railways did accomplish was to foster Indian national-

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ism, by helping to create a middle class—always the most nationalistic element in a society; by generating resentment over their foreign ownership and orientation; and by increasing the opportunities for nationalists to come in contact with each other. Today, at last, under the Five-Year Plans of an independent India, the way is being opened for the railways to play their traditional role, that of stimulating the industrial advancement of the country in which they are built.

China. When the decadence of the Manchus made China vulnerable to encroachment from outside, Europeans took advantage of her weakness from two directions—the Russians (and, to a small extent, the French) from the landward side, and the others from the sea.

The manner in which Russia used transportation as a pretext for insinuating herself within Chinese territory is illuminated by a comparison with the Canadian experience. Both Russia and Canada made use of railroad construction as a tool for promoting political aims. As we have seen, Canada insisted on locating both the Intercolonial Railway and the Canadian Pacific Railway entirely within the boundaries of the Dominion, because she recognized that to do otherwise would be to weaken her ability to remain independent of the United States. When Russia completed the Trans-Siberian Railway to Vladivostok she too stayed entirely within the boundaries of her domain.

Canada eventually constructed a railway across foreign territory in order to have a more direct route to an ocean port. But when she built her road across Maine to reach St. John, that was the *whole* story; Canada had no designs on Maine. Russia too constructed a railway across foreign territory, but, with her, gaining a direct route to Vladivostok was only part of the story. At least as important, and perhaps more so, was Russia's desire to gain imperial advantages in Manchuria. Thus she used the pretext that the Trans-Siberian route was circuitous, to persuade China to enter into partnership with her in the construction of the Chinese Eastern Railway. On her western borders Russia was careful to gain the defensive advantages

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offered by a difference in railway gauge, but the Chinese Eastern, which was intended to be an integral part of the Russian railway system, was built to the wide Russian gauge.

When Russia persuaded China to enter into a further agreement, to build a branch line, the South Manchurian Railway, China took the precaution of insisting (successfully) that the new line have the standard gauge, to conform with the Chinese rail net then being constructed by other European countries. In any case, though Russia's effort at colonial encroachment had placed Manchuria firmly within the Russian sphere of influence, it had the paradoxical result of bringing Manchuria into much closer relation with the rest of China than in the past. For, to counteract Russian influence, the Chinese used the railway to swarm into Manchuria in far greater numbers than the Russians themselves.

The encroachment from the sea was different. Here the pretext of obtaining a convenient corridor across Chinese territory could not be used. Instead there was the naked attempt at economic aggrandizement.

The very absence of adequate means of inland transport at first pinned the Western powers and Japan to their original ocean ports. China could be likened to an organism lacking a circulatory system, which was able, for this reason, to keep foci of infection on its exposed surface from spreading inwardly. Towards the end of the nineteenth century, however, the invaders were able to make their way into the interior by establishing "spheres of influence" and extracting concessions from China to construct railways and to exploit the economic resources thus tapped. The sphere of Germany was Shantung Province, in the northeast; that of Britain, the centrally located Yangtze Valley; of Japan, the coastal area adjacent to Formosa; and of France, the south. Britain tried, without success, to emulate the procedure that Russia followed in Manchuria, by opening a land corridor to Shanghai from her possessions in Burma. France was the only Western power able to advance into China from a broad land base, which was provided by her possessions in Indo-China.

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These efforts by Westerners to improve circulation in China were abetted by one set of Chinese officials, hindered by another. From the beginning, officials of the central government looked to railways to strengthen not only the country, but their own hold on the country. For years they thought of railways more in military and political than in economic terms, going so far as to put them, first, under the Bureau of Naval Affairs, and later, in an office dealing with foreign relations. Only in 1903 was the Ministry of Commerce made responsible for them.

In the provinces, however, the officials strongly opposed the railways. They pretended deep concern for the millions of porters and of boatmen who would be put out of work, but their true reasons were otherwise. Elsewhere, such concern was no pretense. Watermen on the Thames in Shakespeare's London fought the coming of the coaches; portagers on the Sault Ste. Marie River fought the builders of the first canal; canalers fought the railway; railwaymen are fighting the highway; shipping interests are fighting the jet plane. Those with vested interests in older techniques are bound to fight the introduction of new ones. But it was not the porters and boatmen that the provincial mandarins grieved for; it was themselves. Élisée Reclus puts it extremely well:

> At present [in the early 1880's] the difficulty of communicating with the capital makes them almost independent of the central authority in their local administration. But more rapid means of locomotion would have the immediate effect of bringing them under control, and checking their systematic misgovernment of the provinces. Hence their hostility to the inconvenient invention of the "Western Barbarians." But it is not likely that their resistance can much longer avail, and a recent number of the *London and China Telegraph* informs us that a railway 6 miles long was actually constructed early in the year 1882, in connection with the Kaïping collieries in the north.[6]

[6] Élisée Reclus, *The Universal Geography,* London, no date [1880's], Vol. VII, p. 308. The Kaïping railway was, in fact, the first railway built in China, and it is of special interest in that its purpose, like that of the first practical railway built anywhere, the Stockton and Darlington (1825), was to transport

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An additional reason was the chauvinism that proclaimed as its slogan "China for the Chinese." The provincial governors contended (as it turned out, correctly) that far from strengthening China, the new railways would merely put her more firmly under the foreign yoke.

Partly because of the obstructions raised by these governors, but also because the foreign investors were interested only in providing links between existing economic centers, construction of railways was restricted almost entirely to the eastern parts of China, and even here it was sparse. China, with an area of 3,850,000 square miles, an area greater than that of the United States, entered the 1950's with fewer than 20,000 miles of railway track. Yet even this relatively small mileage saddled China with grievous debt. Since, according to an estimate made in 1924, foreign loans at high rates of interest accounted for 80 per cent of railway investment, half the total foreign debt of China was attributable to railways. Very few railways paid their way, and by 1941 only 15 per cent of them were still in Chinese hands. When the Communists took over a few years later, their first concern was, or should have been, to mend the ravages that war brought to the existing trackage, an undertaking that might have been expected to occupy them for the best part of a decade. Yet, in their very first Five-Year Plan (1953-1958), the Chinese Communists proposed to construct 125,000 miles of *new* track—equivalent to more than half the total mileage in the United States. For any non-Communist country it would be a ridiculous ambition. And how did the Communist country fare? It managed to construct about 5,000 miles of track (some 4 per cent of plan), and did much of this badly.

Even the new mileage that was built failed to serve the best interests of the country. Like the Chinese highway construction that is discussed in the following chapter, railway construction concentrated on political and military purposes, with most new mileage being built in the sparsely populated western provinces. Undoubt-

coal. Indeed, the relation between railways and coal has always been of great importance.

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edly, these new lines will help the central authority to make itself felt at the farthest reaches of the country. They may even keep the province of Sinkiang from being lost to the encroaching Russians, *if* the central authority is itself strong. But the bases for strength are being dissipated by precisely such activities as are exemplified by the construction of railways and roads for strategic rather than economic purposes. China would be much better served if the present government followed the example of the rapacious foreign investors, who, to make sure they gained profits from their investments, concentrated on linking up already-existing centers of economic activity. By so doing they would, for a time, restrict the traditional, and geographically unbalanced, economic pattern within its present limits, but increased economic strength would allow them to do a better job later. The "Great Leap Forward" has already resulted in two steps back. Perhaps the Chinese are finding this a salutary experience.

Africa. Of all the habitable continents, Africa is physically the least hospitable to surface movement. Its indigenous political history is correspondingly impoverished. Africa's coastline is short in relation to area (only one fifth that of Europe, proportionately), with very few good natural harbors. There are few great rivers, and, because of seasonal floods and droughts, little of their length is navigable the year around. The edge of the high African plateau closely parallels the coast, so that rivers falling over it do not play the important part that rivers elsewhere do, of giving the interior convenient access to the sea. Where the land that the rivers cross is not so flat as to create vast swamps filled with a dense, impassable vegetation, it is frequently so rough as to make the rivers course through some of the world's mightiest gorges. (The Blue Nile gorge in Ethiopia, for example, has been virtually unexplored until the present decade, when helicopters at last made it possible to descend into its abysmal depths.) Thus the rivers not only give little aid to water transportation along their length, but also are unusually effective in obstructing land transportation across it.

Where Africa has open spaces, it is often hot and waterless. Where

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it has water, there is often too much of it. If all these obstacles to movement are not enough, there is the tsetse fly, which closes thousands of square miles of Africa to draft animals.

In these circumstances the political cohesion fostered elsewhere by surface transportation was lacking in most precolonial Africa. The symbol of tropical Africa, the tom-tom, may also be taken as symbolic of its transportation problem, which made it difficult to communicate over distance in any other way. The isolation of the native tribes of tropical Africa, their lack of political awareness, their inability to league together in the face of danger—all were attributable in part to the difficulty they had in communicating with each other over distance. The tom-tom might send warning messages that the slavers were coming, but it could not bring men physically together in numbers large enough to repel them, or help lay the economic foundation for an adequate defense.

For centuries after European colonizers began their efforts to penetrate into the interior, they were frustrated by the same obstacles to movement that were contributing to the disunity and weakness of tropical Africa. Europeans were confined to the edge of the continent, in coastal forts to which African middlemen brought trade from the interior. To the physical obstacles were added those interposed by the middlemen, who would not allow the Europeans to enter into the continent and dispense with their services by trading directly with the people in the interior. It was not until the latter part of the nineteenth century that the interior of tropical Africa was carved up among the imperial powers. Since the powers agreed among themselves, at the Berlin Conference of 1884-85, that they might retain title only over those areas that they occupied effectively, and since to occupy and control an area they had to be able to reach it, a hectic period of railway construction followed, a period that lasted from 1885 to 1931.

Railway transportation is no easier than any other in tropical Africa. Although improvements to the locomotive by 1885 had made it possible to use it in the tropics at reasonable cost and with reasonable reliability, the barriers to movement catalogued above were

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fully as effective against railways as against roads. Added to these barriers were the difficulties of clearing rights-of-way through the jungle, the lack of suitable ballast material for building roadbeds, the torrential rains that often swept away such roadbeds as were built, the great expense of building some of the most gigantic railway bridges in the world, and (until the recent oil finds in various parts of Africa and the concomitant changeover to diesel engines) the lack of locally available fuel. Consequently, land transportation in Africa has never reached the dimensions that it has in more favored areas.

The state of land transportation in present-day Africa, and particularly tropical Africa, will be better understood if it is compared with that of the advanced country of Canada, which is comparable with Africa in mileage of road and rail, if in little else. Examination of Table 1 shows how sparse the road and rail nets are in Africa as compared with Canada, and how thinly spread the facilities are among the people. Except in railroad mileage, the people of tropical Africa are even more poorly served than those in the rest of the continent.

Here is one explanation for the enthusiasm with which the newly independent nations of Africa have taken to the air. But there is an additional explanation, which in some cases is even more important, and that is the search for national prestige.

SELF-SUFFICIENCY AND PRESTIGE

Transportation lends itself readily to expressions of national pride. When that pride has a firm foundation in a nation's economic accomplishments, it expresses itself in the nation's desire to achieve self-sufficiency in transportation, as it has in Japan throughout her history. When no such foundation exists, the nation may turn for help to other, richer nations and acquire transportation facilities beyond its means. If, in thus turning to others for help, the nation has full regard for its economic needs, then it places itself on the road to self-sufficiency. If, on the other hand, its new acquisitions are altogether unrelated to its economic needs and cannot find jus-

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Table 1 *Land Transportation in Africa and Canada*

	All Africa	Tropical Africa*	Canada
Area (in thousands of square miles)	11,600	8,000	3,800
Population, 1959 (in thousands)	236,000	118,000	18,500
Railways (in thousands of miles)	43	21	43
Roads (in thousands of miles):			
Improved	415	190	383
Paved	60	20	43
Motor Vehicles, 1959 (in thousands)	2,200	545	5,000
Square Miles of Area			
Per Mile of Railroad	270	380	88†
Per Mile of Paved Road	194	400	88†
Per Motor Vehicle	5.2	14.7	0.8
Population			
Per Mile of Railroad	5,500	5,600	430
Per Mile of Paved Road	3,900	5,900	430
Per Motor Vehicle	107	217	3.7

* Data approximate.

† If only the one-seventh of Canada's area that contains almost the whole population is considered, then these figures become less than 13. (Compare the continental United States, with about 13 square miles of area per mile of railway and 3 square miles of area per mile of paved road.)

tification in other real needs, such as strategic ones, then they are merely an empty gesture, made in the interests of an illusory prestige, and in the end they can lead only to harm. In such a case the commerce between transportation and politics is carried out in debased coin.

The Self-sufficiency of Poland in Shipping. A striking illustration of the lengths to which the desire for self-sufficiency can go is provided by modern Poland. After the first World War she took advantage of the new access to the sea that she acquired by way of the Danzig Corridor to create a small merchant marine. After the second World War the shifting of the Polish-German border some 200 miles westward, to the Oder-Neisse line, and the acquisition of part of East Prussia gave her a coastline on the Baltic of some 500 miles, thus broadening her maritime base. The acquisition of what

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was the Free City of Danzig (now Gdansk) and of the important sea port at the mouth of the Oder, Stettin (now Szczecin), was of particular importance.

Poland was determined to achieve self-sufficiency in deep-sea and coastal shipping as rapidly as possible, but she was hindered from doing so by Russia's colonial, even mercantilist, policy towards her satellites during the first decade after the war. This policy was prosecuted through COMECON (Council for Economic Aid), which was Russia's answer to the Marshall Plan. The activities of COMECON were directed, during this first decade, to tying the economies of the satellites as rigidly as possible to that of Russia, and entirely for the advantage of Russia. Polish resentment over this policy was one of the elements that led to the uprising of 1956. Significantly, the uprising began "not in the streets, nor in the Universities, where intellectuals simmered in captivity, but in the industrial heart of Communist Poland. In actual fact, it started in the Cegielski marine diesel engine plant which had just begun to plan new units for Poland's new 10,000 ton cargo liner ships." [7] This uprising, together with the more violent one in Hungary, led Russia to relax her grip on her satellites' economies, and in the short time that has since elapsed, Poland has advanced far towards the self-sufficiency she desires. So strong is her determination that she has supplemented her large shipbuilding program by chartering ships from other countries, so that as much of her sea-going commerce as possible will move in bottoms flying the Polish flag. In the process she has greatly enhanced her position, both in the Communist world and beyond it.

Ghana's Prestige Airline. The national pride of Poland, which is finding expression in the search for self-sufficiency in shipping, has been one of the constant elements of European history for a thousand years and more. The national pride of the African nations newly emerged from colonial status is almost as new as the nations themselves. It came only with independence or, as in Nigeria, with

[7] John D. Harbron, *op. cit.,* p. 16. All the facts in the present discussion of Poland are drawn from Harbron's book.

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the long struggle to gain it. But the national pride of the African nations is no less strong for that. It takes its most sriking form, in transportation, in the proliferation of national airlines whose chief function is to serve as emblems of prestige. The money for these airlines must necessarily come from abroad, either from the camp of the erstwhile colonizers and their allies or from the Communist camp. The most notorious example is that of Ghana, which, abetted by both the Eastern and the Western camps, spent so much money on an all but useless airline that she undermined her whole economy.

This is not to say that the acquisition of national airlines by the former colonies of Africa is in every case unrealistic. For reasons that we have discussed, over many parts of the continent's vast interior one moves by aircraft or not at all. For decades France wished to extend a railroad southward from Algeria into the interior of Equitorial Africa, and Britain wished to link Cairo to the Cape. Neither succeeded. Today the airplane can provide the links, and the new nations of Africa are taking advantage of its ability to do so.[8]

However, none of this applies to such a country as Ghana—small in area (92,000 square miles), with few really difficult physical barriers between its parts, with a relatively well-developed road network (2,000 miles of paved road, 5,000 miles of road improved with gravel, crushed stone, or stabilized soil—exceptional for tropical Africa), and with few external contacts of the sort that require air travel. All her real needs could be met by the international airlines of the more advanced nations, which land in Ghana in great numbers because of her pivotal position on the world's air lanes. Only the search for prestige could have impelled Ghana to acquire a national line. The attribution of symbolic political value to transportation has here been carried to an extreme. Possibly a similar

[8] All these aspects of African transportation, and much else about transportation and politics that appears in this book, are brought out in a superb article on the Ethiopian Airlines published in *Business Week*, January 12, 1963, pp. 106-108.

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attachment to symbolism is behind Poland's insistence on self-sufficiency in shipping, but Poland has the economic base needed to sustain her strenuous efforts to achieve it, and the base is in turn strengthened by it. In Ghana neither condition obtains.

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5 *The Role of Government*

THE relations between government and transportation are pervasive. They range from the intimate to the cosmic—from the building of a road past a farmhouse to the launching of an interplanetary rocket into space. All levels of government, from the most parochial to the most universal, spend much of their time promoting, financing, and regulating appropriate levels of transportation. Nowhere does the individual, free or oppressed, feel the weight of government more directly, or benefit more personally from its activities. Nowhere is the ponderous machinery of international negotiations brought more frequently into operation.

POLITICAL PHILOSOPHY OF GOVERNMENT

It is this pervasiveness of government in transportation that makes the philosophy of government one of the most important factors in determining what kind of transportation a people gets. One cannot, however, say dogmatically that one philosophy is bound to result in good transportation facilities for the people; the opposite philosophy, in bad facilities. It may be particularly misleading to project one's value judgments on differing philosophies to the transportation systems that results. We think individualism preferable to absolutism, democracy preferable to dictatorship. Does it necessarily follow that the people will be better served, with respect to their transportation needs, by individualism and democracy than by absolutism and dictatorship? Examination of a map may lead to the conclusion that this is not so. On the other hand, examination in the field, or of historical evidence, may lead to the conclusion that it is.

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Absolutism and Individualism. Compare England and France in the eighteenth century. The roads of England were execrable, those of France superb. The English traveler, Arthur Young, wrote in 1787 that

> if the French have not husbandry to show us, they have roads; nothing can be more beautiful, or kept in more garden order, if I may use the expression, than that which passes through a fine wood of Monsieur Neuvillier's; and indeed for the whole way from Samer it is wonderfully formed: a vast causeway, with hills cut to level vales;

but he immediately added:

> which would fill me with admiration if I had known nothing of the abominable corvées that make me commiserate the oppressed farmers, from whose extorted labour this magnificance has been wrung.

Most significant, too, is Young's comment on the roads entering Paris, which

> are deserts, comparatively speaking, with those of London. By what means can the connection be carried on with the country? The French must be the most stationary people upon earth, when in a place they must rest without a thought of going to another. Or the English must be the most restless; and find more pleasure in moving from one place to another than in resting to enjoy life in either.

There is the real difference between French absolutism and English individualism in the eighteenth century. The roads built under the British form of corvée, the statute labor laws, which were very indifferently applied and so unpopular that they were repealed in 1835, did not amount to much, but they were *used*. The people had a great variety of vehicles at their disposal—hackney coaches and sedan chairs, mail coaches and carriages. Travelers could put up at inns and hostels, and throughout the country there was the exhilaration and bustle of movement. The road had become as prominent a part of the Englishman's life as it is today, and we can get an idea of how joyous a part it was from the books of Dickens, who wrote just as the road was being submerged, for a time, by the rail-

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way. Open *The Pickwick Papers* at almost any page, and the excitement of the English road and the English inn appears.

Under French Absolutism the superb and empty roads had one purpose: to link all parts of the country together under the despotic power of the monarch at Versailles, to serve as avenues for the speedy movement of his troops and couriers. Only the nobility had carriages, and they traveled little. Ordinary people traveled not at all.

The pattern of the countryside was duplicated in the cities. London's streets were narrow and crooked. When a great new road was projected for London, it passed not through the city, but around it, to carry heavy traffic away from the most congested areas—one of the earliest examples of the by-pass that is so familiar in our day. In the Baroque cities of France wide, straight avenues radiated from a central place, so that troops might be marched down them in impressive formation, and all would be in the line of fire of artillery pieces located at the center.

In sum, the contrast between absolutism and individualism here exemplified is one of planned excellence, austerely serving the ruler, and slapdash improvisation, fully used by a free and mobile people.

Dictatorship versus Democracy. It might be thought that the debate between dictatorship and democracy is simply another aspect of the debate between absolutism and individualism, and so, to a certain extent, it is. But, as modern phenomena, dictatorship and democracy introduce certain differences that must be catalogued.

When one reads a description of the roads of absolutist France, one seems to recognize the terrain; one has already been there. Are the roads superb, and built primarily for military purposes? One thinks of the Autobahnen of Hitler Germany. Are they empty of traffic? That is Communist Russia, to the life. But the apparent similarities are misleading. Russia's roads are not merely as empty as were those of absolutist France, they are as execrable as were those of individualist England. In Russia overland transportation for all purposes has been monopolized by the railways, and this fact, not dictatorship as such, accounts for the poorness of the roads

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and their emptiness. In any case, the Soviet planners have in the past tended to economize on transportation. American authorities have been amazed at the amount of service they were able to extract from the facilities they had. Where individual preference is given little weight, certain forms of efficiency are possible that are denied to countries guided by a more permissive philosophy.

It is characteristic of modern dictatorships that every activity is consciously directed to political ends. So it was in Nazi Germany, so it was and is in Soviet Russia, and so again it continues to be in Communist China. It is not surprising, therefore, to find the Chinese attributing political motives to every attempt by their predecessors to improve transportation. Quite often their contentions are preposterous, but sometimes they only appear so.

When, for example, the Communist highway chief, T'ang Chan-tung, complains that the imperialists refused to build roads into the Chinese northwest and southwest, one is at a loss to understand what imperialist motive was served thereby, for these roads would have had real strategic importance, and their lack seriously weakened the Chinese empire. On the other hand, there may be some justification for T'ang's statement that, "In order to rule and oppress the people and to carry out the counter-revolutionary war, the reactionary ruling classes constructed the first highway in 1913." T'ang tells us no more about this highway than that it connected the towns of Changsha and Siangtan. On consulting a map we are mildly astonished to discover that these towns, deep inside China, are only 30 miles apart and, moreover, lie on the same river, so that there is not even the pretext that the highway forms a portage between two strategically important river systems. What neither T'ang nor the map tells us, however, is that Changsha has long had a tradition of rebellion, and that the central government (for which read "the reactionary ruling classes") may well have needed to give it special attention. A few years earlier, when Mao Tse Tung was a boy in Hunan (of which Changsha is the capital), troops were marched to the town to put down a revolt, and news of the massacre that followed turned him into a dedicated revolutionary. Indeed, it

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was in Changsha that Mao began his large-scale political activities, within half a dozen years after the "counter-revolutionary highway" was built. Perhaps these facts were in T'ang's mind when he made his statement, which accordingly may not be as silly as it sounds.

The Communists, of course, make no bones about their own use of transportation improvements for political purposes. They boast of building military roads to fend off aggression from Korea and Formosa, and in the First Five-Year Plan (1953-1958) special attention was given to providing just those links to the northwest and southwest that their predecessors neglected to build. To be sure, their overt purpose, though political, was not imperialist; they were built in accordance with Chairman Mao's directive "To Help Our Fraternal Nationalities." When one notes, however, that three of the roads make it convenient to enter recently-subjugated Tibet from three different directions, one may be permitted to wonder how helpful some of the fraternal minorities found these improvements in transportation. Like the new railways that are being pushed into previously inaccessible parts of China, these roads are providing the strong links of communication upon which empire depends.

The exaggeratedly political orientation of Chinese transportation policy has led the country into difficulties that it might otherwise have avoided. Unquestionably, the transportation system that the Communists inherited was extremely poor. It did have the geographic imbalance that T'ang complains of (it is the astonishing truth that, even in the densely populated eastern parts of the country, more than half of the *hsien* capitals, the county seats, had no rail or road service), but in concentrating overmuch on political and military considerations the Communists created an imbalance of their own. Only when the economic needs of the Chinese people are given their full weight, unadulterated by other considerations, will a realistic balance of transportation facilities be achieved.

We know that democratic governments may also use transportation for political (read "strategic") ends. Indeed, they are in duty bound to do so. Only in exceptional times, however, are such considerations allowed to become paramount. Democratic governments

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are directly answerable only to their electorates, and they know that in normal times nothing they do is more recognizably politic, more likely to result in favorable votes, than is a program of conspicuous improvements in transportation. (Some dictatorships have known this too. Apologists for Fascist Italy could boast that Mussolini at least made the trains run on time, and Hitler's Volkswagens probably helped ensure the docility of the German people. One is at a loss to think of a comparable example in Communist countries. But perhaps Communists would maintain that an ideologically mature populace has no need for such bribes.)

Even in democratic countries, however, and particularly in times like these, governmental expenditures on large-scale transportation facilities are sometimes easier to justify if the facilities can be shown to be needed for defense. On this continent the St. Lawrence Seaway, the Trans-Canada Highway, and the Interstate Highway System, all of which required the expenditure of large sums of money by the federal governments of Canada and the United States, all had their legislative paths eased by this justification. Nobody pretends, however, that their possible military usefulness is their chief reason for being, as it was for the German Autobahnen. Still, there is little public protest when military considerations force the making of an otherwise uneconomic expenditure, as happened when the Defense Department insisted that all overpasses on the $41-billion Interstate System that had been built to the standard 14-foot or 14½-foot clearance be raised to 17 feet, to allow for the overland transport of intercontinental ballistic missiles. This required the spending of an extra billion dollars—but not by the Defense Department, which would not pay any of it. There may have been some shaking of heads, but there was no outcry.

On the whole, what characterizes transportation under a democracy, and distinguishes it from that under Communist dictatorship, is its intensely personal nature. People move freely wherever, whenever, and however they please. The contrast is most strikingly evident in divided Germany. In East Germany there are 65 persons for each motor vehicle, in West Germany, 13—a proportion of five to

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one. Even Russia does better than its satellite, with 56 persons per vehicle. The extremes are reached by the United States, which is approaching the minimum figure of 2 persons per vehicle, and China, with over 3,000. The imagination boggles at a China with the same vehicular density as the United States—over 300 million vehicles!

Freedom of movement is the triumph of democracy, but it is not without its disquieting aspects. Movement that is untrammeled by government may be trammeled by itself, and government may be forced to interfere more directly than it wants to. The Russian government does not have to step in and rescue mass transit from the automobile or unsnarl monumental traffic jams in all its cities and on all its recreational highways. Western governments do. The extent to which they succeed or fail will be a measure of the success or failure of democracy itself. There are observers, Lewis Mumford outstanding among them, who take a very gloomy view of democracy's prospects of solving this truly democratic problem.

Private versus Public Enterprise. Although much is made of the distinction between private and public enterprise, particularly in the United States, the two are not so incompatible as always to exclude each other. They operate differently in countries at different stages of development, and it is safe to say that the stage of development is at least as important as the philosophy of government in determining which form of enterprise will be favored.

The subject is extremely complex, and it will therefore be well to concentrate on a single medium of transportation, one that will demonstrate the diversity of the conditions that can arise. Highways will not serve our purpose, because they have everywhere been recognized as a public responsibility, and even in Canada and the United States the turnpikes of over a century ago and the private toll roads of today have little significance in the overall pattern. It must be mentioned, though, that one of the most celebrated decisions of the United States Supreme Court involved the rights of private and public enterprise as expressed in competing highway facilities. This was the decision of 1837 on the Charles River Bridge

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case, in which the rights of the public were upheld over those of private interests.[1] Nor will airlines serve better, because the United States stands alone in having all except military aircraft in private hands, whereas in most other countries government has a full or partial monopoly on airlines. Shipping offers a more complex picture, but it is interesting chiefly as an instrument of international exchange and will be examined as such. We are left with canals and railways. Either will serve, but our choice falls on the latter, for they offer the most rewarding insights into the effects of the two kinds of enterprise.

We are immediately faced with a seeming paradox. The United States has always been the bulwark of private enterprise. One would therefore expect that in no other country would private enterprise play so important a role in the construction of railways. In fact, this is not so. In only one country has the railway system been built without the aid of government, and that country is England. In all other countries, including the United States, there has been some degree of governmental involvement, ranging from the raising of loans and the guarantee of returns on investment to the granting of subsidies and the outright construction and operation of nationalized railroads. The federal government of the United States has experienced every degree of involvement with railroads except the ultimate one of direct ownership. It has raised loans, provided subsidies, chiefly by way of land grants, and for a short time even operated all the railroads in the United States. During World War I, private management, in marked contrast with its splendid performance in World War II, seemed unable to keep the railroads from collapsing under the burden placed on them by wartime needs, and the federal government took over.

The explanation for the paradox is simple. It involves what Walt W. Rostow has called the "take-off," the interval of time when the

[1] The details may be found in the excerpt from Carl Swisher's biography of Chief Justice Roger B. Taney (Macmillan, New York, 1935), published under the title, "The New Supreme Court," in *Voices in Court,* edited by William H. Davenport (Macmillan, New York, 1958), pp. 195-217.

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forces in a nation that have resisted growth are finally overcome, and growth becomes the normal condition.[2] England was the only country in the world to experience take-off before the coming of the railway. She was thus the only country to have available within her own borders a massive accumulation of capital and a body of businessmen who were not only enterprising, but had the necessary experience to mobilize large-scale financial undertakings and put together complex corporate structures. These were the conditions for successful railway construction, and in other countries only the government had the resources to meet them. Further, the United States shared with other countries occupying sparsely-settled continental expanses—Canada, Australia, Russia—the difficulty not experienced by relatively tiny England, that of using the railway itself to open up the country. In closely built-up England all parts of the railway network could immediately attract profitable traffic, but when railways were built from "Nowhere-in-Particular" to "Nowhere-at-All," as the London *Times* put it, then the speculative risk was too great for individuals to assume unaided.

In most other countries outside England it was the railway itself, by or with the aid of public enterprise, that triggered the take-off and put each country on the road to economic maturity. It is surprising that even England should have constructed her railroads solely through private enterprise, for the most significant fact about railroads is that the indirect benefits they confer upon a country as a whole far exceed the direct benefits for which the entrepreneur can be paid in the form of profit. Though in England the railroads did not open up new territory, they did make accessible areas that could not be reached by river or canal and were ill-served by roads. The indirect service they performed in other countries was correspondingly greater, not only in opening vast tracts to settlement and economic exploitation, but also in bringing in huge sums of capital and teaching local businessmen new management skills that could later be applied to other large-scale industrial enterprises. Railways

[2] W. W. Rostow, *The Stages of Economic Growth,* Cambridge University Press, 1960, p. 7.

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have also, as we have seen, served in nation-building (Canada and Germany), empire-building (Russia), and the consolidation of empire (India and Africa). Thus it is altogether fitting that public enterprise has played so great a part in the construction of railroads, even in the United States.

Though most railroads in Canada were constructed by private enterprise, with massive aid from the government, and though Canadians would on the whole prefer to give private enterprise full scope, there were no ideological barriers in the way when circumstances made it necessary for the federal government to take over a number of roads that were facing bankruptcy and consolidate them into the Canadian National Railways. Some roads, such as the Ontario Northland, have always been government-owned. All told, over half the railway mileage in Canada is now state-owned. In England there has been a complete turnabout, and the whole railway network has been nationalized. Besides the Communist countries, where ownership of the railroads rests by definition with the government, all or nearly all the railway mileage in most Asian and African countries and in Oceania (Australia and New Zealand), three South American countries (Argentina, Uruguay, and Venezuela) and nine countries in continental Europe (Austria, Belgium, Finland, France, Luxemburg, the Netherlands, Norway, Turkey, and West Germany) is state owned. In the United States, even in these times of grave trouble for the railways, the political philosophy of the country makes it impossible even to hint at nationalization as a solution. The railways will continue to be privately owned. Among all the other nations of the world, only Costa Rica, with 90 per cent of railway mileage in private hands, is comparable to the United States in this respect. The only other countries having more than half their railway mileage privately owned are Peru (78 per cent) and Bolivia (62 per cent).

The relative positions of private and public enterprise are, however, shifting, even in the United States, for all media of transportation. The period of radical change through which the world is now passing, with its emphasis on nationalism, is strongly reflected in the

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field of commercial transportation, and governments everywhere are becoming more and more intimately involved with its operations. Within each country equally radical changes are taking place. Shifts in dominance are universal—between carrier and carrier, between one mode of transport and another, between country and country, between levels of government in the same country. Railroads, under government regulation, and sometimes under government ownership (for example, the Canadian National Railways), are acquiring fleets of trucks for piggybacking, to the distress of private truckers; the private automobile and the jet plane have cut passenger travel on railroads to a dribble, and governments are looked to for subsidies to commuter lines, and for permission to abandon uneconomic routes and to merge competing roads; jet aircraft now carry more trans-Atlantic passengers than do ocean liners; Canadian subsidies to shipbuilders adversely affect the shipbuilding industry in the United States; governments of the newly independent nations are creating their own merchant navies and using them as instruments of international politics, thereby endangering the traditional maritime leaders, such as Britain, who continue to think of shipping in purely commercial terms (but this too is changing: the British government is about to abandon its century-old policy of non-interference with the commercial affairs of the merchant marine); the nations of Latin America, disturbed that less than 10 per cent of their international trade is conducted among themselves, that overland trade between neighboring states is virtually non-existent, and that they pay $1.25 billion annually to have their exports transported by foreign ships, are banding together to improve their own transport facilities, both external and internal, by governmental action.

Most critical of all, in a world that is becoming increasingly urbanized, are the problems involving urban transportation. Should precedence be given to private or public vehicles? Should public money be spent on highways or on mass transit? How much financial responsibility should higher levels of government take for the solution of municipal problems?

The problems are aggravated by anomalies in economics and in

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geography. Economically, highway transportation is in the anomalous position of partaking of the characteristics of the marketplace, whose activities are regulated by the price structure (in the buying and selling of private vehicles or of the services they perform) and of government, whose financial needs are met by taxation (in the construction of the highways themselves). Geographically, movement in metropolitan areas is no respecter of boundaries. It passes indiscriminately through county, township, suburb, and central city, each with its own type of government. The attempt to reconcile the frequently opposed interests of all these levels of government, and at the same time pay due regard to private interests, greatly complicates the solution to urban transportation problems.

THE ROLE OF THE NATIONAL GOVERNMENT

Transportation is one of the chief responsibilities of all levels of government. In many cases it may be one of the chief sources of revenue, and it is certain to be one of the chief burdens on the budget. It would be desirable to discuss in detail the relation between transportation and government at every level, but we have space to do so for only one. Since national governments have the greatest variety of responsibilities, and since, unlike lower levels of government, they are responsible for transportation problems not only within the country, but outside it as well, we shall concentrate our attention on them.

A classification of transportation problems as external and internal might seem to be a logical way to begin. Indeed, the external-internal classification might logically have been made at almost any earlier point in the present study. That it has not been made suggests how inextricably entangled the external and internal aspects of transportation may become.

What, for example, could be more straightforward than the competition between truck and rail within a country? It would seem obvious that any problem that this competition might present to government would be an internal problem. But this does not take into account the essential unity of transportation. Goods may cross

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international boundaries even though transportation media do not, and the need for transshipment presents opportunity for intervention in the internal affairs of one country by the external activities of another. Thus, the competitive position of truck and rail within Canada has been radically affected by the manipulation of ocean freight rates by Japan. The details are not important, but the principle is: external and internal transportation problems cannot always be kept rigidly separate. Once this has been said, however, the way has been cleared for a realistic discussion of the responsibilities of national governments for both external and internal transportation.

External Problems. Taking precedence over all other external problems involving transportation are those of defense. The fact that the armed forces have traditionally been designated by their mode of transportation—the army (infantry, cavalry, tank corps), the navy (ships of the line, destroyers, undersea craft), the air force (bombers, fighters)—is sufficient commentary on the importance of transportation in the national government's involvement with defense.

Defense activities have, however, this peculiarity: *because* they are directed towards protection from outside aggression, the most strenuous efforts are made to keep as much information about them as possible hidden from outsiders. Here secrecy is inevitable, but it is not so in the other major field of activity in which transportation involves national governments, that of conducting international negotiations to regulate movement between nations. Not all covenants between nations are open, or openly arrived at, as Woodrow Wilson would have had them, but most of those involving transportation are, by their very nature. Not always, though. During World War I Russia had a secret treaty with her allies giving her Constantinople as a prize of war. It was the public confession by the moderate revolutionary leader, Miliukov, that the treaty existed and that he was for it, because "the Russians must have a warm water port through which to pass, themselves and their goods, back and forth, the year round," that helped set the Russian Revolution on its disastrous

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course towards Bolshevism. If similar treaties exist today, we do not, of course, know about them. We may assume they do exist, especially when they involve defense. But when the Russians after World War II tried once more to improve their position on the Dardanelles, they did so openly, and their attempt was frustrated when Britain and the United States came to the aid of the Turks.

The fact that almost all land is within some country's boundaries restricts the scope of international negotiations involving land transportation. Most international activity on road and rail is directed towards the exchange of information, the pooling of equipment, the standardization of railway rolling stock, road signs, and so on, through the medium of various federations, such as the Inland Transport Committee of the Economic Council, the International Union of Railways, and the Permanent International Association of Road Congresses. National governments have also co-operated in the construction of international highway systems. Most famous of these is the Pan-American Highway. When the 450-mile Darien Gap through mountainous jungle regions in Panama and Colombia is completed, this highway will form a network of roads nearly 19,000 miles long connecting a score of nations in North and South America and stretching from Alaska to Patagonia. Equally ambitious, though necessarily on a smaller scale, is the system of *Europastrassen* focusing on the Autobahnen of Germany and linking Scandinavia to France. Perhaps the most imaginative international road program is one sponsored by the United Nations, for the construction of a 7,000-mile road across the southern tier of Asian countries, from Turkey and Iran to Malaya, Thailand, and Vietnam. This road, it is hoped, will once again provide overland links across the Asian continent that once were important, but have since fallen into disuse. The road has been said to follow the path used by Marco Polo nearly 700 years ago. From the Pamirs eastward, however, Marco Polo's travels took him through country that is now part of Communist China, and consequently outside the United Nations' sphere of interest.

For the rest, international negotiations on land transportation

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chiefly involve border crossings, transit rights, and corridors. The latter rarely involve land transportation alone. The major cases are Pakistan, which requires transit rights across India between its widely separated eastern and western parts, and West Berlin, which requires similar rights for travel across East Germany to West Germany. Both of these are actual or potential causes of international tension. This statement, happily, cannot be made about Alaska, which is separated from the rest of the continental United States by a friendly Canada. Usually, transit rights and corridors are needed by states that are landlocked and therefore cannot gain access to the sea by road or rail in any other way (for example, Czechoslovakia, which requires transit rights to the ports of Hamburg, Szczecin, and Trieste; and Iraq, which would have been landlocked if it had not been granted a narrow corridor of land that places it on the Persian Gulf), or find it convenient to cross another state's territory in order to reach a warm-water port (for example, Canada, where the direct route between the Maritime Provinces and the rest of the country crosses Maine).[3]

Inland transportation offers the greatest scope for international negotiations when it involves rivers that run through or between several countries. The freedom of navigation on international rivers was first proclaimed, in 1792, by the Executive Council of the French Republic. Only after more than twenty years passed was the principle accepted by an international body, when the Congress of Vienna laid down the fundamental rules for the navigation of the Rhine. The Rhine has ever since been the subject of international agreements, and the history of the Central Commission for the Navigation of the Rhine, which was established in 1816 and is still in existence, "constitutes a remarkably successful example of international collaboration, which has resisted time, revolutions and wars."[4]

[3] See Norman J. G. Pounds, "A Free and Secure Access to the Sea," *Annals,* Association of American Geographers, Vol. 49 (1959), pp. 256-268, for a full treatment of this subject and of the one immediately following.

[4] H. Walther, "The International Statute of the Rhine and the Central Commission for the Navigation of the Rhine," *Transport and Communications Review,* Vol. 2, No. 4 (Oct.-Dec., 1949), p. 20.

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A river on which international co-operation is perhaps even more essential than on the Rhine is the Danube, because it passes through or between so many more states, many of which have no other water-borne outlet to the sea. Unfortunately, the recent history of the Danube is less amicable, for, unlike the Rhine, it crosses the Iron Curtain. Of the seven states that had riparian rights on the Danube before the last war, only Germany and Austria are in the Western camp. Yugoslavia is neutral, and Czechoslovakia, Hungary, Romania, and Bulgaria belong to the Communist bloc. After the war Russia made herself the eighth riparian state on the Danube by taking Moldavia from Romania, thus gaining a position on the mouths of the Danube and control of the important port of Izmail. Before the war, navigation on the Danube system was unrestricted, and ships of all nations had equal treatment along the whole length of the Danube itself and even on some tributary rivers. Not only were all riparian states represented on the European Commission of the Danube, but even such nonriparian states as France, Italy, and Great Britain. Now, with Russia and her satellites in the majority and laying down the rules, there are no longer any representatives from nonriparian states on the Danube commission, and international amity is at an end.

The most noteworthy recent example of international co-operation to improve navigation on a river is provided by the St. Lawrence Seaway. Not that the Seaway has had a placid history. Far from it. That history has been complicated by the rivalry between Montreal and New York, which expressed itself in rivalry between the St. Lawrence and the Hudson; by sectional rivalries within Canada and the United States; and by rivalry between railway and shipping interests. A further complication has been introduced by a factor extraneous to transportation, that of hydroelectric power. The constantly recurring battles are well exemplified by the one that raged in 1931 between Governor Franklin D. Roosevelt and President Herbert Hoover. The former upheld the sectional interests of New York and the partisan interests of the Democrats. He championed states rights, favored public development of hydroelectric

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power, and gave precedence to power over navigation. The latter upheld the national interests of the United States and the partisan interests of the Republicans. He championed the rights of central government as opposed to states rights; he (it goes without saying) insisted that the power would be developed only through private enterprise; and he went along with the Middle West in giving precedence to the navigational aspects of the Seaway. In Canada, again during the 1930's, similar battles involving personalities were fought between Prime Minister Mackenzie King, for the federal government, and Premiers Mitchell Hepburn and Maurice Duplessis, for the governments of Ontario and Quebec, respectively. First one country was all for the Seaway, with the other holding back, then the positions were reversed, then reversed again, until finally Canada threatened to go it alone. Two considerations brought ultimate agreement from the United States to join Canada in the undertaking: the discovery of iron ore in Quebec-Labrador, which was greatly needed by Midwestern steel mills as a substitute for the depleted reserves in Minnesota; and the belief that the Seaway would contribute materially to the continental defense system.

If the story of the St. Lawrence Seaway is unusually complex, it is so only because the Seaway involves the national governments of two federal states that are of vast extent and have a great diversity of sectional, public, and private interests, and includes outside considerations that compete with the purely navigational ones of the project. But it does serve to illustrate the difficulties that negotiations between national governments can run into even when they involve merely bilateral agreements.

When transportation moves out into the open sea, the situation sometimes approaches anarchy. There is not even a simple answer to the question, "Where does the open sea begin?" Is it three miles from the shoreline of a nation (however "shoreline" is defined)? Is it six miles? Twelve miles? There are countries contending for each of these, and Peru goes so far as to claim for herself the 200 miles of ocean bordering her coast! One of the most celebrated recent cases of bi-national contention over offshore limits has been that

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between Britain and Iceland; the latter claims fishing rights over the zone extending 12 miles from her shores. Canada, like the United States claims only three miles as the breadth of her territorial sea. But, worried by the inroads on her fisheries made by the Japanese on her west coast and, in these days, by the Russians, with their gigantic factory ships, on her east coast, she would like to see her three-mile limit augmented by a contiguous zone of nine miles, over which she would have exclusive fishing rights.[5]

The changing of land boundaries has often played havoc with inland transportation systems. Even worse results would follow the changing of jurisdictional limits on the world's seas so that they all conformed to the 12-mile limit.

> If all states were to extend their waters to twelve miles, according to one estimate, some three million square miles would be lost to the regime of the high seas. Such an area is equivalent to that of the United States. More important, many of the world's strategic straits and narrow passages along continental margins and between islands in archipelagos would be converted from high seas to territorial seas.[6]

This is but one aspect of the vexed question of the *freedom of the seas*. In opposing the 12-mile limit Britain and the United States stand together, but it was not always so. Freedom of the seas is a doctrine that comes naturally to the United States, but not at all so to Britain, whose very existence as a great maritime power once depended upon the seas *not* being free, but under her domination. During the Napoleonic Wars the governments of the countries in northern Europe combined themselves into an "Armed Neutrality"

[5] As this book went to press, Britain announced that it was abandoning the three-mile fishing limit around its coast, in view of the failure of the Law of the Sea conferences of 1958 and 1960 to reach agreement on the extent of territorial seas and fisheries jurisdiction. Many other European countries have, like Iceland, raised the fishing limits around their coasts from three miles to six or 12 miles. Now Canada too has decided to press for the 12-mile fishing limit.

[6] G. Etzel Pearcy, "Geographical Aspects of the Law of the Sea," *Annals,* Association of American Geographers, Vol. 49 (1959), pp. 1-23.

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to establish the principle of "free ships, free goods," a paraphrase of the principle of freedom of the seas. Britain, however, insisted on her fundamental right of seeing to it that her enemies were not supplied by neutral nations. Further, when British deserters took out false naturalization papers and served on American ships, Britain insisted on her right to stop and search those ships. (This practice, which outraged American sensibilities, was a direct cause for the only war ever fought between the United States and Canada.) In 1856, by the Declaration of Paris, the British government gave up the right to search neutral ships for contraband in time of war, and this was the principle that by the end of the century was given the name "Freedom of the Seas." Under this principle, the nationality of the ship became the nationality of the cargo.

But in these days, what is the nationality of the ship? Nowhere is the approach to anarchy on the sea so close as here. When a ship is on the open sea, she is almost a small political state unto herself, and her captain may almost be said to have the powers of a head of state. But the flag she flies may be nothing more than a flag of convenience, which is far from being a symbol of national pride. Because their flags are so much in use as flags of convenience, Panama and Liberia appear to be among the greatest shipping nations in the world, but they are merely havens to which shipowners in countries such as Canada and the United States may escape, as when the seamen's unions or federal taxes become too much for them.

International competition is as intense in the air as it is at sea, and once more there is a struggle over differing concepts of freedom. By general agreement, there is one freedom that does not exist, the freedom to disregard national boundaries. In spite of the frequently repeated and quite plausible statement that the airplane has made these boundaries obsolete, they are rigidly observed by all national governments. The boundaries go straight up, and no government may violate any other government's air rights with impunity. Today, however, the age-old question has real urgency: "How high is up?" A manned plane intruding without permission on a nation's air space may be shot down as a matter of right. It would be un-

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thinkable to shoot down a manned satellite. Perhaps it therefore follows that not the plane, but the space ship, has made national boundaries obsolete in *all* respects.

If the freedom of one country's planes to fly over another country is not a natural right (as access to the sea is now regarded as a natural right), it is one that can be granted, and *must* be granted, if international flights are not to be rendered impossible. In 1944 an International Air Transport Agreement was signed, in which each of the signatory states granted to the scheduled international air services of the other signatories "Five Freedoms of the Air." These freedoms become progressively broader, beginning with the mere right to fly across a country without landing, and ending with the right of a plane from Nation A to pick up mail, passengers, or cargo in Nation B and deposit them in Nation C—in short, the right to compete with another nation's airlines in their own precincts. So broad a range of freedoms has proved unacceptable to most countries, and in fact, the world has reverted to the system of bilateral agreements whose abuses the enunciation of the Five Freedoms was intended to correct.

The political implications of these freedoms are great, particularly when they are denied. In 1961, for example, the situation in the Congo was ripe for Soviet exploitation, but the Soviet Union was unable to take full advantage of it because the Sudan refused to allow Soviet planes (or Egyptian ones either) to fly over its territory on their way to the Congo.

Although bilateral agreements remain of great importance in civil aviation, there are two international organizations that make multinational co-operation possible. These are the International Civil Aviation Organization (ICAO) and the International Air Transport Association (IATA). The members of ICAO are national governments, those of IATA the operating airlines. Since so many of the latter are owned by governments, however, it is reasonable to say that both organizations are international instruments for co-ordinating national policies.

Internal Problems. The responsibilities for internal transportation

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of the national governments of such countries as Canada, Australia, the United States, and (in theory) the Soviet Union are complicated because the governments are federal, and therefore have to contend with the often touchy problems of provincial or states rights. The tangled story of the St. Lawrence Seaway is, as we have seen, sufficient illustration of the difficulties that can arise. Both in Canada and in the United States navigable rivers and canals are the responsibility of the federal governments, as is regulation of railways and airlines. With respect to highways, however, there is contrast. In the United States the federal government plays a leading role in the planning and financing of highways, whereas in Canada its role is minimal. There is no equivalent in Canada for the Federal Aid system of highways, and the 40,000-mile Interstate Highway System has for counterpart only the single Trans-Canada Highway, which has little more than one-eighth the mileage.

Even in the United States, however, the state governments carry the chief responsibility for the more than three million miles of road in the country. As is true of the provincial governments in Canada, state governments are responsible for the major rural highways, and co-ordinate the work of lower levels of government—the counties, towns, townships and villages—in improving roads of more local interest. Much of the work of a state or provincial highway department involves the mere transfer of roads from one political jurisdiction to another. No physical change may immediately result. Indeed, the traveler may see no difference before and after, except, perhaps, in the presence or absence of a highway number or the changed color of the line that represents the road on a highway map. Yet the essential character of the road has been altered. Who pays for the road's upkeep, and how—by gasoline tax, or vehicle registration tax, or tax on abutting land? Who now does the actual work of maintenance? What will the road's future condition be? The answers to these questions are all largely determined by this political act of transfer. In extreme cases, the complete abandonment of the road can result, and, with it, a radical change in the economy and demography of the area that it once served.

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Politics and transportation are most intimately enmeshed, and their interaction is most directly experienced by every citizen, at the grass roots—where local transportation media are administered by municipal governmental bodies. Understandably, here is where friction is most continuous. Above all, the planning of adequate transportation facilities can be greatly helped or be rendered altogether ineffectual by the action or inaction of elected office-holders. It is here that national governments, through their research and educational efforts, are performing some of their most valuable services. They cannot dictate, but they can try to persuade, and this they are doing.

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6 *Total*

THE apparently cryptic title of our last chapter will be found, on reflection, to be not so cryptic after all. It accurately describes the condition we now find ourselves in, and it has particular relevance for the present study because the revolutionary changes in transportation have been the single most important harbinger of totality. The changes began with the opening up of the whole world to exploration half a millenium ago. They were liberating changes, breaking the close confines within which people once lived. They have ended by closing territorial space until the confines are tighter than they ever were before. Once there were horizons beyond which one might hope to find the promised land. Today there are no more promised lands. We must make do with what we have; for escape we must look—literally—out of this world, for there is no hiding place down here.

The totality that most frightens us is that of war. We have a deep aversion for political totalitarianism, but we are not frightened of it. Having defeated it in one of its manifestations, we may hope that surviving ones will evolve into something better. But we *are* frightened, and must be if we are to survive, of total war.

A revolution had to take place in the minds of men before total war could emerge. Deficiencies, no less than successes, in transportation have helped prepare the way for this revolution. The transportation media pre-eminently associated with total war before the missile age, and the ones whose very strengths and weaknesses have led to totality, were the submarine (the only means of transportation that has never been used for any purpose other than war) and the airplane.

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When Robert Fulton, who invented the steamboat, built the first practical submarine, Napoleon turned it down because his advisers thought it impractical. Fulton then offered it to the British, but the Admiralty would have none of it because they thought it all too practical; they were afraid that what Britain started the enemy might finish. The Admiralty was derided for this decision, but it may have been the right one. The submarine was not used against Britain for more than a century thereafter. Once it was used, it proved catastrophically effective against a nation so dependent upon the sea. But, before it could become so effective, a change had to take place in the way men thought about war.

When the Germans first started submarine warfare in World War I, they tried to stay within international law, under which warships had the right to "visit and search" merchantmen on the open sea, and to capture them if they belonged to the enemy. If capture was impossible, the merchantmen could be sunk, but only after passengers and crew had been safely removed. Because of their limited space and small crews, submarines could not accommodate people from ships that were about to be sunk, and their helplessness when surfaced made it excessively dangerous for them to "visit and search." As in the animal world, magnanimity comes with strength. (According to the naturalist Konrad Lorenz, the most vicious of animals are the rabbit, the deer, and that symbol of love and peace, the turtle dove; the most chivalrous is the wolf.) The pre-nuclear submarine could not afford to be magnanimous. It had to abandon the rule of law, or be itself abandoned. When the Germans opted for the submarine and against law, they inaugurated the era of total war. On February 1, 1917, they announced their determination to sink on sight any ship, of no matter what nationality, that sailed to or from an enemy port.

The submarine introduced total war to the sea in World War I. In World War II the airplane introduced it to the land. Sir George Cayley, who antedated the Wright brothers by a century, and who has been given precedence over them by a French authority as "le véritable inventeur de l'aéroplane," saw the air as "An uninterrupted

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navigable ocean, that comes to the threshold of every man's door." He added that it "ought not to be neglected as a source of human gratification and advantage." What the plane brought to the threshold of every man's door in World War II was destruction. It is in the nature of strategic, high-altitude bombing that it cannot select its targets with precision. Even if the object is to knock out a military installation, nearby civilians are bound to be killed. This deficiency of the bomber alone would have brought total war to the land. But the revolution in men's minds had already taken place. What had at first been done reluctantly by the submarine and had become deliberate policy, now became the deliberate policy of the strategic bomber. Civilian populations were now prime targets for destruction, so that the efficiency of the enemy might be impaired and his will to fight weakened. Postwar study has shown that, in spite of the devastating raids made by colossal Allied air fleets on German cities, this policy was surprisingly ineffective. Even attacks on true military targets such as airframe factories did little to slow up the German war effort. Only when Allied bombers turned their attention to German oil installations, thus denying to German planes, locomotives, and tanks the fuel without which they could not move—only when total war was momentarily abandoned and the motive power for military transportation was destroyed—did the bomber have its full effect.

But by then it was too late. Totality had now become a normal policy, to be resorted to whenever it promised to achieve results. It is one of the most terrible ironies of history that, not the totalitarians, but the anti-totalitarians, have been the only ones to have used the most truly total of all weapons, the nuclear bomb. The resort to total war by anti-totalitarian states may have been unavoidable, just as the adoption by the British Admiralty of the submarine eventually (after a century) proved unavoidable. Nonetheless, historians of the future may decide that these states might have served their own cause better if they had made more obvious efforts to avoid it.

Totality is more a negative than a positive phenomenon. The political philosophy of totality, totalitarianism, is chiefly characterized

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by its abolition of freedom. Totality in transportation and politics is the result of a whole series of abolitions. If civilization is to survive, it must result in at least one more.

THE ABOLITION OF DISTANCE

We hear a great deal nowadays about this first abolition, the abolition of distance. As long ago as 1844 Ralph Waldo Emerson used the phrase to describe what the locomotive and the steamboat were doing to life in America. A little more than a century later, in the aftermath of a war in which the long-distance bomber had been a decisive weapon, the phrase was dismissed by the eminent military historian, Cyril Falls, as cant. Falls called upon common sense to tell us that geographic position still meant something, that the islands of New Zealand were still safer than the British Isles. Even in 1948 it should have been obvious that the safety conferred by distance was fleeting. German V-1's and V-2's had already dropped on London, and nuclear bombs had already been exploded over Hiroshima and Nagasaki. One could be sure that it would take only a very sort time for refinements both in the vehicles of destruction and in their warheads to make every spot on the surface of the earth vulnerable to almost instantaneous, and almost totally devastating, attack from every other spot.

There are few people today who would dispute this point. There are those who might say, with Herman Kahn, that even an all-out war, in which all of a nation's largest cities were utterly destroyed, need not necessarily mean total destruction for the nation itself. But no one has pretended that any given stationary point, anywhere on earth, can escape almost instantaneous destruction, given the determination to destroy it. (Note the adjective "stationary"; it is an important qualification, and we shall return to it. But even this qualification may become unnecessary, if Herman Kahn's earth-destroying "Doomsday Machine" is ever built.)

We may say, then, with Emerson, that distance has indeed been abolished, or effectively so. But is this what we mean? Do we not mean, rather, that *time* has been effectively abolished? Two antip-

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odal points on the earth's surface are still some 12,450 miles apart, but where it once took months to cover the distance between them, it now takes minutes. And this time element refers only to bodily movement, of men or material. Ideas can cover the distance in one-fifteenth of a second.

THE ABOLITION OF TIME

When the Emperor Wu Ti sent out diplomatic missions to the lands beyond the edges of his empire, over two millennia ago, he was prepared to wait for his results. Depending on how far they had to go, some of his missions returned in two years, some in six, and those that had to go farthest—past Kashgar and the Pamir Knot to Ferghana—did not return until eight or nine years had passed.

The waiting was taken as a matter of course, for in those days transportation contained a powerful element of time. If you wanted to cover space, you had to be prepared to allot an adequate amount of time to the process. Nor did things progress with much greater speed for fifteen centuries thereafter.

But only for certain things, such as friendly diplomacy, was this the case. Even in the time of the Mongols, when most travel was still at a leisurely pace, certain requirements were felt with sufficient urgency to cause men to squeeze as much of the element of time out of travel as possible. Such a requirement was the provision of fresh fruit or fish for the Emperor's table, or for the delivery of urgent messages. Then men running in relays would cover a distance of 150 miles in 24 hours (a fantastic figure, but it turns up again in Prescott's writings about Aztec Mexico and the Incas of Peru).

The greatest urgency, all through history, has been assigned to the needs of war. Friendly diplomacy might move slowly, but for war the fastest chariots, the sleekest ships, were provided. And to give warning of war the speeds of sound and of light itself were used. Relays of shouts, of drums, of church bells, of successively lighted beacons or smoke signals, could rapidly transmit the warning that the enemy was coming. But though information could be thus

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transmitted with remarkable speed (the whole east coast of England was apprised of the arrival of the Spanish Armada by a swiftly coursing series of fire beacons), communication dependent upon such means of transmission was necessarily restricted in the amount of information it could convey. The introduction of codes could not remove this restriction, for even if an individual message could have been transmitted in all its complexity, and with every nuance of meaning intact (something that is not always successfully done by the most advanced communication systems of today), this would be the *only* message being transmitted by that system at that time. Such a system might do to alert a country to the coming of an invader, and might go so far as to supply essential, broad-scale details, as to numbers, direction, and speed—that is, it was a system that had its uses in an emergency—but for day-to-day exchange of complicated political negotiations this method would not serve. And widespread personal exchanges by this means were, of course, out of the question.

Detailed communication required the transportation of physical objects on which the messages were recorded—that is, the mail. The progressive elimination of time from transportation, therefore, took place most rapidy in the postal service. Observe the progression as it occurred in England. Up until the later years of the Tudors, messages might move on horseback over a distance of 24 to 50 miles in a day—the latter figure only rarely, and in either case only if relays were provided every 10 or 12 miles. After 1650 the stage coach might travel as much as 60 or 70 miles a day in the summer. At the time of the American Revolution, the flying coach could do 100 miles in a day, and the climax was reached, just before the railway took over, when the mail coach could cover 220 miles a day. That is, in the days before mechanical power, and aside only from the remarkable imperial relays of the past, regular travel at as much as ten miles per *hour* over long distances was impossible for the fastest of vehicles. The meaning for politics is made clear by just one example: Andrew Jackson would never have won fame at New Orleans if communication through transportation had been faster in his day,

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for the news did not reach him that the War of 1812 was over until *after* the Battle of New Orleans had been fought.

Electronic communication has removed the need to transport objects carrying complex ideas, for ideas that need to be urgently communicated can now be transmitted with the speed of light. But it is the fantastic truth that, if we restrict ourselves to orders of magnitude, we can speak realistically of moving physical objects—including objects of destruction—in terms of the speed of light.

Consider Table 2. The speed of an orbiting satellite is at the exact midpoint, in orders of magnitude, between the speed of an army

Table 2 *Speeds in Orders of Magnitude to Base 4.5*

Medium	Speed (approximate, in miles per hour)	Factor (approximate)
Army moving long distance on foot	0.5	$\frac{4.5^0}{2}$
Wagon, coach, sailing ship	2.25	$\frac{4.5^1}{2}$
Early steamship	10	$\frac{4.5^2}{2}$
Car, train	45	$\frac{4.5^3}{2}$
Propeller-driven plane	200	$\frac{4.5^4}{2}$
Jet plane	900	$\frac{4.5^5}{2}$
Missile	4,000	$\frac{4.5^6}{2}$
Orbiting satellite	18,000	$\frac{4.5^7}{2}$
Telecommunication	Speed of light	$\frac{4.5^{14}}{2}$

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moving on foot at the rate of twelve miles a day, and the speed at which messages by telegraph, telephone, radio, and television move —the speed of light. That is, the satellite moves some 36,000 times as fast as the army; the message, some 36,000 times as fast as the satellite.

This speed is not the limit that man has achieved, but for movement from one spot on earth to the other it is all that is needed. Space vehicles that are given greater velocity will orbit at greater and greater distances from the earth, and when they go faster than 25,000 miles per hour they leave the earth altogether. For movement on earth the ultimate has been reached. To the extent that time can be abolished, it has been.

THE ABOLITION OF PHYSIOGRAPHY

In the process, something else has been abolished, and that is physiography. Everything in the earlier chapters of the present book has assumed the existence of physiography and its significance in the affairs of men, but in a total world physiography loses its meaning.

Pick up any book on the strategy of space warfare, and you will see this statement confirmed. Any earlier book on strategy or history or war was constantly preoccupied with physiography. Barriers, corridors, terrains, islands, continents, drainage systems—the whole gamut of physiography was run through. This statement is as true of Churchill's *The Hinge of Fate* as of Mahan's *The Influence of Seapower on History,* Clausewitz's *On War,* and Thucydides' *History of the Peloponnesian War.* But read Herman Kahn's *On Thermonuclear War* or Bernard Brodie's *Strategy for the Missile Age,* and physiography disappears. In space war the earth becomes a featureless sphere, and it makes no difference where any point on its surface is—whether deep inside a continent, or on its edge, or out at sea, whether high among mountains, or surrounded by deserts, or hidden in a wooded ravine. *As long as it is stationary* it has exactly the same degree of vulnerability as any other point on earth—abso-

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lute vulnerability. In Kenneth Boulding's phrase, there is no longer any *inviolable space* on earth.

If the point is not stationary, then in effect Heisenberg's Uncertainty Principle enters. It is no longer absolutely vulnerable, but motion, not position, has made the difference. For this reason the planes of the Strategic Air Command have for years flown in random patterns, and nuclear submarines course the world's oceans, again in random patterns. As long as they are in motion, and their position is not known, then the nuclear weapons that they carry have a chance to be fired, should their home country come under nuclear attack.

THE ABOLITION OF WAR

Consider the triad: the configuration of the earth's surface, political action, and the technology of transportation. Once the three were in balance. As long as the configuration of the earth's surface was able to put obstacles in the way of transportation, particularly the transportation of materials for destruction, then catastrophes brought to humanity through political ineptitude, though severe, were not in danger of becoming ultimate. It was still possible to defend ideologies, opposing ways of life, in the knowledge that no matter what happened something would survive. Technological immaturity still brought salvation, through the interposition of shrinking amounts of space and time, to political immaturity. At the present moment political immaturity remains, and it is aggravated by the revolution in men's minds that has led them to accept totality. But the technology of transportation has now reached full maturity, making the configuration of the earth's surface completely inoperative, and thus removing the saving elements of space and time.

It is of the greatest significance that the fiercest battles in which the armed forces of the United States have been engaged in recent years have been internecine battles, the prize being control of the intercontinental ballistic missile. Once upon a time the area of predominance of each of the services was relatively clear-cut. As we have seen, it was directly based upon transportation. Soldiers and

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their weapons moved—by foot, horse, or mechanized vehicle—over land and fought for possession of terrain; sailors and their weapons moved in ships over water and fought for control of the sea; and airmen too moved in their own element. Enemy disputed space with enemy and consumed a great deal of time in doing so.

Now the point has been reached at which classification of the armed services according to their mode of transportation has become meaningless. This is the significance of the suggestion by the Presidential adviser, Walt W. Rostow, that the army, navy, and air force be abandoned in favor of nuclear, conventional, and guerrilla forces.

If Rostow's suggestion were to be followed everywhere, then there is a good chance that war—total, unrestricted war—would be abolished. Conventional and guerrilla forces will do for limited engagements, but all-out war would have to involve the nations' nuclear arms. If there is a balance of conventional and guerrilla forces, we may be confident that no nation will resort to ultimate weapons. For it is dawning on the world that the only possible winners of a nuclear war are those who stay on the sidelines. It is at last being understood that for civilian targets time has been abolished. One no longer hears of plans to evacuate cities on the alert. Though defense by mobility is effective when it is the arms themselves that are kept in motion, the defense of urban populations by mobility is now seen to be illusory. It can be safely predicted that all other forms of civil defense still being advocated will go the same way. The terrible fact is that, at the present moment, there is a fatal imbalance between transportation for the offense and transportation for the defense. As I have said in another place, "A single, instantaneous stimulus must be met by a fragmented, protracted response."[1] A missile carrying a nuclear warhead is launched, and five million people five thousand miles away must take action to minimize the effect of the explosion that within 15 minutes will utterly destroy the city they inhabit. The essence of the problem is movement, and within the given

[1] R. I. Wolfe, "A Geographer Looks at Herman Kahn," *International Journal,* Vol. 5, No. 4 (Winter, 1962), p. 57.

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terms the problem is manifestly insoluble. There simply is not enough time.

Nor is there any question but that a country desiring to do so can utterly destroy another country, no matter how large or powerful. Again the problem of transportation and the lack of time are determinative.

Now the largest and most powerful countries know this. They also know that if they destroy each other (and each knows that it cannot destroy the other without itself being destroyed) the world that emerges from their war will be dominated by neither of them. Instead, it will be the prize of one of the remaining, and relatively unscathed, countries of the world—the one that has, and is disposed to use, the most effective conventional and guerrilla forces.

THE LAST UTOPIA

Once upon a time, when men looked into the future, their vision was hopeful. When Sir Thomas More wrote of his island of the future, he called it *Utopia,* meaning "No Place." But what he saw (satirical though his view was) made people think that he meant Eutopia, the "Good Place," and ever since then we have used the word "utopian" to describe visions that were too good to be true. Later inventors of utopias remained in this tradition, which culminated with the nineteenth-century writer Edward Bellamy's dream of the future, presented in his book *Looking Backward*. But other dreamers dreamed of real utopias. Man's duty, they proclaimed, was not to examine the world, but to change it—and so we had Marx and Engels, who wrote the blueprints, and Lenin and Stalin and Mao and Khrushchev, who made them reality. This reality has led to other visions, but this time they were horrifying—Aldous Huxley's *Brave New World* and George Orwell's *1984*. In all of these, transportation played little part; they were all politics. But the most modern utopians, such as Ray Bradbury and E. B. White (I am thinking of the latter's "The Morning of the Day They Did It"), have placed the new transportation, that of the space age, in the

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center of their vision. Even without the idiocies of politics, what they saw was pure nightmare.

It is time to build new optimistic utopias. We must recognize the progression that has prevailed throughout history, and hope that it can continue. Each advance in the technology of transportation, with few exceptions, was first used for aggression. But as refinements came, along with them came peace. Once there was no peace, on land or sea. When roads were poor, highwaymen flourished. But as they improved, and as the loneliness of the countryside was dissipated by constantly passing stage coaches and mail coaches, the roads became as safe as a castle. Once it was taken as a matter of course that a ship sighted was a ship to be feared. Any ship might be a privateer, and as long as it carried a *letter of marque* it had the right to capture any ship of another country that came its way. When Elizabeth sent Francis Drake out to sea, at a time when she was not yet at war with Philip II of Spain, she ordered him to

> forbear to enter forcibly into any of the said King's ports or havens or to offer violence to any of his towns or shipping without harbouring, or to do any act of hostility upon the land. And yet, notwithstanding this direction, her pleasure is that both you and such of her subjects as serve there under you should do your best endeavour (avoiding as much as may lie in you the effusion of Christian blood) to get into your possession such shipping of the said King or his subjects as you shall find at sea.

(As it happens, Drake never received these orders, and proceeded to raid Cadiz, to sink ships in its harbor, and to wreak general havoc.) The logic of *letters of marque* was clear: war could come at any time, and the sunken ships, the stores and treasures, were denied to the enemy when war did come.

Preparations for war at the present time are not of the same order. We do not destroy a potential enemy's resources for war; we try to improve our own. It was unthinkable then *not* to destroy. It is unthinkable now *not* to be ready. But the time must soon come

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when it will be as unthinkable to be ready for war as it is now unthinkable to destroy another's resources in time of peace.

The last utopia must be the most splendid. It must partake of the insight of Pierre Teilhard de Chardin, who saw that "we stand face to face with all the grandeur, the unprecedented grandeur, of the phenomenon of man." [2] Teilhard speaks of "the current planetisation of the noösphere." The *noösphere,* according to Teilhard, is a product of the mind of man. First came the *lithosphere,* the layer of rock that forms the earth's surface. On this was laid the *hydrosphere,* the layer of water in which came the beginnings of life, which, as the *biosphere,* spread a layer of living things over the whole earth, and culminated in man. In the few thousand years that man has been expanding his awareness—of himself and of his environment—he has created the noösphere, the *thinking layer.* Only since the revolutionary changes in transportation and communication that began five hundred years ago with Prince Henry the Navigator and have gone on with ever increasing acceleration in the last two hundred years has this layer spread itself over the whole surface of the earth.

Ours is an age of unprecedented awareness. We are aware of the sphericity of the globe as no generation before us could possibly be. We have been made familiar with details of its surface, everywhere, on all continents and under all oceans, that none before us could have imagined. We look back on more thousands of years of history than our forebears believed existed, and we look forward an equal number of years. Archaeologists are probing 10,000 years into the past to discover the origins of civilizations; and geneticists try to estimate what the effects on human genes will be 10,000 years hence if nuclear fallout continues to be produced uncontrolled. At the most generous, then, we are trying to bring within our mental grasp a span of human civilization extending over a period of 20,000 years. By our own individual time scale this span is immense; it is, indeed, unimaginable. By any more universal scale, however, it is inconsequential. No need to refer to astronomical time, or even

[2] Pierre Teilhard de Chardin, *The Phenomenon of Man,* Collins, London, 1959, p. 215.

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geological. Human time is sufficiently long-lasting to suggest how small a span 20,000 years is. Recent anthropological discoveries have doubled the age of humanity: we have been on earth, as human beings, not one million, but two million years. That is, the unimaginable span of 20,000 years corresponds to just one per cent of human existence—so far. And, unless we ourselves do something to cut the time short, by poisoning our environment in one way or another (nuclear fission will do it; so will pollution of our water supply, or exhaustion of our food resources) humanity may look forward to additional millions of years of existence—hopefully, of civilized existence. On such a scale, civilization has barely begun. Perhaps it has not yet begun. Perhaps one condition for its beginning is that we recognize that distance and time have indeed been abolished and that we take this into account in our endeavors to live with each other.

The word "total" has until now been a word of terror, but it need not be. Teilhard, in a splendid mental leap, suggests that "totalitarianism itself [is] really the distortion of something magnificent, and thus quite near the truth." [3] There are now so many of us, we move so freely about and can communicate so easily, that we are members of one another more truly and intimately than ever before. The last utopia lies in the noösphere. It can be a good place.

[3] *Ibid.*, p. 257.

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A VAN NOSTRAND SEARCHLIGHT BOOK

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About This Book:

This fascinating book is a far-ranging survey of world history from a new perspective. The author maintains that transportation facilities are too often thought of only in economic terms, when in fact they exert pervasive influence upon political and military events, often in totally unexpected ways. Examining the relationship between physical environment and technological advancement in transportation from a political point of view, the author argues that the frightening crisis of our time is caused in part by an imbalance between the highly advanced state of the technology of transportation and the primitive state of our political institutions. He cites examples of the way in which politics and transportation interact with one another in war and peace—within a single country and among different countries. These examples range from the eastern Mediterranean in ancient times to a world faced by the possibility of total destruction; a world in which—largely because of tremendous advances in the transportation of men and weapons—total contact and total war are possible.

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